MEDICAL LIBRARY

OCT 19 1949

BRITISH MEDICAL JOURNAL

JOURNAL OF THE BRITISH MEDICAL ASSOCIATION

SATURDAY OCTOBER 1 1949

TABLE OF CONTENTS

Fat Absorption and Some of Its Problems H. S. RAPER, C.B.E., D.SC., F.R.C.P., F.R.S. 719
Modern Trends in Radiology JAMES F. BRAILSFORD, M.D., Ph.D., F.R.C.P. 724
Sphincter-preserving Operations in Cancer of Rectum STANLEY O. AYLETT, F.R.C.S. ..728
A New Mechanism of Vitamin Deprivation A. C. FRAZER, M.D., D.SC., M.R.C.P. 731
Tuberculosis of the Breast RONALD W. RAVEN, O.B.E., F.R.C.S. 734
Cerebral Metastases from Bronchial Carcinomata GEOFFREY FLAVELL, F.R.C.S., M.R.C.P. ..736
Trichostrongylus Infestation in South Persia IAN S. STEWART, M.B., Ch.B. 737
Case of Pulmonary Strongyloidiasis FINTAN L. CORRIGAN, L.R.C.P.I. 738
A Tidal air Whistle F. C. EVE, M.D., F.R.C.P. 739

MEDICAL MEMORANDA

A Case of Twins. AILEEN P. M. DRING, M.B., B.S., D.R.C.O.G. 740
Congenital Pyloric Stenosis in Three Successive Male Babies of the Same Parents. J. L. ADLINGTON, M.B., Ch.B. 740
Congenital Pyloric Stenosis in Binovular Twins. E. S. R. HUGHES, F.R.C.S., H. A. D. SMALL, F.R.C.S., and J. W. F. MACKY, F.R.C.S. 741

GENERAL ARTICLES AND NEWS

Reorganization of the Medical Services of the Armed Forces. E. A. SMYTH, M.B., M.Ch.Orth., F.R.C.S.I. 751
STREPTOMYCIN 752
MEDICAL DEFENCE UNION 752
TREATMENT OF CEREBRAL PALSY 753
Anti-external Rotation Abduction Splint and Bed Cradle. E. K. McLEAN, F.R.C.S.Ed. 754
UNIVERSITIES AND COLLEGES 764
MEDICAL NEWS 765
BIRTHS, MARRIAGES, AND DEATHS 766
QUESTIONS AND COMMENTS 767

OBITUARY

J. Tylor Fox, M.D., D.P.M. 760
R. E. Bickerton, D.S.O., M.B. 761
G. C. Williams, O.B.E., M.R.C.S., D.P.H. ..761
G. J. Stefanopoulo, M.D. 762
Donald Ross, M.B.E., M.B. 762
B. J. F. Jackson-Taylor, M.R.C.S. 763
William Stewart, M.D., M.Ch. 763
James Kearney, L.R.C.P.I. 763
Harry Smith, M.R.C.S., D.P.H. 763

Epidemiology Section 764

LEADING ARTICLES

Distinction Awards for Consultants 745
A Year of N.H.S. 746
Serum Jaundice 748
Remuneration of General Practitioners ..750

ANNOTATION

Staphylococcal Toxaemia 750

REVIEWS

A Study of Sick Society 742
B.C.G. 742
Lewis's Cardiology 743
Essays in Psycho-analysis 743
The Reticuloses 743
Modern Practice in Psychiatry 744
Books Received 744

SUPPLEMENT

The Secretary Reports 147
Health Service.—WELFARE OF AGED AND DISABLED—MEDICAL PRACTICES COMMITTEE REPORT—TRAVELLING EXPENSES OF PATIENTS' RELATIVES—REGISTRATION OF OPTICIANS—HEALTH SERVICE NOT TO BE TOUCHED—SOME HEALTH SERVICE PAYMENTS 148
QUESTIONS ANSWERED 149
HEARD AT HEADQUARTERS 149
GENERAL MEDICAL SERVICES COMMITTEE 150
CONSULTANTS AND SPECIALISTS COMMITTEE 151
GENERAL MEDICAL SERVICES SUBCOMMITTEE (SCOTLAND) 152
CORRESPONDENCE 153
H.M. FORCES APPOINTMENTS 158
ASSOCIATION NOTICES 158

CORRESPONDENCE

The M.R.C.P. Sir HENRY TIDY, M.D. ..755
Trends in Medical Education. H. E. COLLIER, M.D. 755
Hypnosis in Treatment. NEVILLE MURRAY, M.B.; A. P. MAGONET, M.D. ..756
Distinction Awards. G. H. COLT, F.R.C.S. 756
A New Neonatal Syndrome. CRYSTAL BATES, F.R.C.O.G., and A. P. M. PAGE, M.D. 756
Transfusion in Domiciliary Midwifery. P. S. SANADE, M.B. 756
Poliomyelitis. N. G. NICHOLSON, M.B. ..757
Poliomyelitis Vaccination. M. H. F. JOHNSON 757
Gravitational Ulcers of the Leg. R. P. WARIN, M.D. 757
Essential Hypertension in Pregnancy. R. H. PARAMORE, F.R.C.S. 758
Parturition after Pneumonectomy. F. KELLERMAN, M.D., and R. SAUVAN SMITH, M.B. 758
Memorial to Charles John Bond. C. KILLICK MILLARD, M.D. 758
Old Age. J. RUSHWORTH LUND, M.R.C.S. 758
Syringes. JOHN FOSTER, F.R.C.S. 758
Local Analgesia. R. A. H. FULTON, F.R.C.S. 758
Penicillin in Emergency. T. REES, M.R.C.S. 759
Antiseptics for Minor Dressings. I. B. SNEDDON, M.B. 759
Myxoedematous Madness. S. LEONARD SIMPSON, M.D.; RONALD LASS, M.R.C.P. 759
Points from Letters 760

MEDICO-LEGAL

Deaths Following Injections of Convalescent Measles Serum 764

BRITISH MEDICAL ASSOCIATION, TAVISTOCK SQUARE, LONDON, W.C.1

No. 4630, WEEKLY, PRICE 1/6

Copyright

REGISTERED AS A NEWSPAPER

Clarks

NEW CORRECTIVE HEEL

for Children

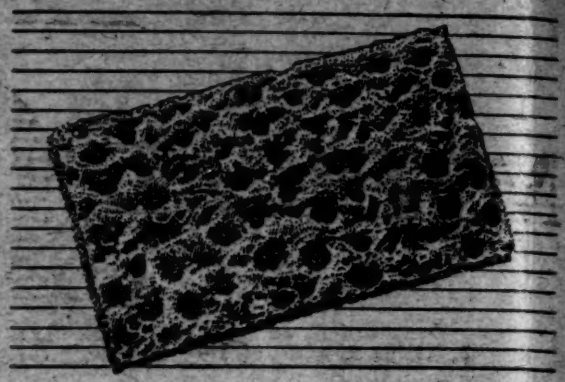
Clarks have pleasure in announcing that they are making a new heel, suitable for attachment to an ordinary pair of Clarks Children's Shoes, which can successfully replace the use of T-irons or heavy surgical boots in the treatment of certain foot ailments and leg weaknesses.

CLARKS CURATOR HEEL

has been clinically tested by an orthopædic surgeon, who has employed it in a number of cases with most encouraging results. The heel, moulded in light-weight rubber, is shaped to give arch support to weak feet (valgus feet).

It is intended, as far as possible, to ensure that there shall not be indiscriminate use of this corrective device. Clarks prefer that it should be used only when specified by medical practitioners and that its fitting, etc. should be under expert supervision. Full details are available to members of the medical profession, children's clinics, etc. on application to Clarks.

C. & J. Clark, Ltd., Street, Somerset.



A palatable whole grain rye bread prepared in a form virtually free from moisture, so that complete mastication is assured. Ryvita can be eaten as an alternative to other breads. Many find that its characteristic flavour stimulates appetite.

RYVITA

Many doctors have already taken out one of the special policies designed by the

MEDICAL SICKNESS SOCIETY

to supplement the National Health Service Superannuation Scheme. Have you? If not write at once for particulars.

If you are a General Practitioner who is entitled to compensation for loss of goodwill you will receive interest at the rate of 2½%. Why not use this interest to extend your provision for Superannuation by investing it in one of these Policies?

Please write to—

THE MEDICAL SICKNESS, ANNUITY & LIFE ASSURANCE SOCIETY, LTD.

7, Cavendish Square, London, W.1

(Tel.: LANgham 2992)

referring to this advertisement

HIGHLY SATISFACTORY RESULTS follow the adoption of

SALT'S PATENT COLOSTOMY BELT

Since we first introduced this Belt we have supplied many hundreds, and the results have been highly satisfactory. Outstanding advantages are: (1) Receiver is detachable and sterilizable by boiling; (2) Bag easily removed without removal of belt; (3) Bag easily emptied and washed; (4) No crevices or metal fittings to hold faeces; (5) Smell reduced to a minimum; (6) Less bulk than the old style. Bags are easily and economically replaced. Further details and Measure/Order forms available to professional people on request.

Appointments a London address: 1, *STANLEY HOUSE*, 103, *Marylebone High Street, London, W.1. Tel.: Welbeck* 3034

SALT & SON LTD · BIRMINGHAM 2

BRITISH MEDICAL JOURNAL

LONDON SATURDAY OCTOBER 1 1949

FAT ABSORPTION AND SOME OF ITS PROBLEMS*

BY

H. S. RAPER, C.B.E., D.Sc., F.R.C.P., F.R.S.

Dean of the Medical School and Professor of Chemical Physiology, University of Manchester

Some twenty years ago physiologists considered that the process of fat absorption was largely understood. Fats were supposed to be taken up by the intestinal cells only after hydrolysis to fatty acid and glycerol, and neutral fats were never absorbed as such. Furthermore, since free fatty acid, although well absorbed, is not found free in the chyle, it was assumed that reconversion of fatty acid and glycerol to neutral fat occurred in the cells of the villi, and that this neutral fat was then passed on into the lacteals. There was no suggestion then that any portion of the fatty acids which were produced by hydrolysis of the food fat escaped this process of resynthesis and gained access as such to the blood or the lymph. But there was not then, and there is not now, sufficient quantitative evidence to tell us exactly what happens to the whole of the fat absorbed after any one meal.

This picture of the mechanism of fat absorption, accepted as largely true, as I say, twenty years ago, has had considerable doubt thrown upon it in the last decade. But it was not as complete as I have suggested even before then, for the passage of fat from the cells of the villi to their central lacteals was not understood. Sharpey-Schafer had suggested from histological investigation that this transfer was carried out by amoeboid cells in the reticulum of the villus. But the difficulty of accounting for the speed at which fat absorption may take place by the unaided activity of these cells has not supported Sharpey-Schafer's view. What is more probable is the view of Verzar that the pumping action of the villi causes fat to enter the central lacteals, and that the absorption not only of fats but of other substances is promoted in this way.

Earlier Beliefs

Before dealing with recent work it will be profitable to consider on what kind of evidence these views of twenty years ago were based.

Evidence that fat is absorbed only after hydrolysis in the intestinal lumen was partly histological. Even at the height of fat absorption, fat particles could not be seen in the free border of the cells of the villi, though they were abundant in the body of these cells. It is, however, well known that fat may be present in cells and not be stainable as particles or globules, so that histological evidence by itself, which does not support the idea of fat being absorbed in a very highly emulsified state, is not conclusive. More convincing evidence was that, although fat-like substances such as esters of fatty acids are well absorbed, there is no evidence that this can be done without their previous hydrolysis by the lipase of pancreatic juice. For example, fatty acid esters such as cetyl palmitate, ethyl palmitate, and a lauric acid ester of mannitol are all well absorbed, but none of them appears unchanged in the fat of the chyle. What is found there is the glyceride of palmitic or lauric acid respectively.

Other information on this question had been got by feeding oily substances which were like fats physically but not chemically and were capable of being emulsified. It was found that they were completely unabsorbed. In this category come experiments with lanolin, mixtures of petroleum jelly and lard, or petroleum oil and olive oil. With the mixtures of natural fats and petroleum hydrocarbons the natural fat was absorbed but the petroleum product was not. The non-absorption of the petroleum was demonstrated either by its complete recovery from the faeces or by its non-appearance in the fat of the chyle.

Evidence, then, that fats could be absorbed only after hydrolysis to fatty acid and glycerol seemed fairly conclusive. But the problem of how fatty acids were absorbed even after hydrolysis still remained. The higher fatty acids are as insoluble as the fats and would still have to be absorbed from the fine suspensions or emulsions which were supposed to be present in the intestinal lumen, and histological appearances did not give any evidence that this actually happened. For this reason it had been suggested that the fatty acids formed soaps which, being soluble in water, could be absorbed in solution. There were two facts against this. First, it was believed that soaps are not formed at the faintly acid reaction of the upper regions of the small intestine. Secondly, even if soaps could be formed, there is not enough alkali secreted in the pancreatic juice to produce soap from the whole of the fatty acids which might be liberated from the fat taken at a normal meal.

The fact that bile salts will dissolve fatty acids, and, furthermore, the discovery that the lecithin normally present in bile assists this action very considerably, showed that a means existed whereby fatty acids could be brought into solution in bile and thus be absorbed in the dissolved state. There is ample proof, both from clinical findings and from animal experiment, that the presence of bile in the small intestine is essential to obtain the figure of about 90 to 95% absorption of fat which is normally found.

*Sharpey-Schafer Memorial Lecture given at the University of Edinburgh on May 19.

The effect of bile in promoting absorption might be due to its well-known adjuvant action on the hydrolysis of fat in the small intestine by pancreatic lipase. This would facilitate fat-splitting, and this was deemed a preliminary essential to absorption. But examination of the faeces in cases of biliary obstruction and consequent steatorrhoea showed that fat-splitting was not defective. Therefore, at the time I am considering, it was the solvent action of bile salts, potentiated by lecithin, which appeared to provide the explanation of the action of bile. Other possible ways in which the action of bile might be accounted for have been pointed out since; I shall deal with these later, for the mode of action of bile in promoting fat absorption is still a physiological problem. Nevertheless, at the time of which I am speaking, this solvent action of bile on fatty acids was accepted as solving the problem of how the insoluble higher fatty acids might be brought into solution and so absorbed.

Evidence that fatty acids when absorbed are resynthesized and appear as neutral fat in the lacteals was first provided by Immanuel Munk nearly 70 years ago. By collecting chyle from the thoracic duct of dogs to which fatty acids had been administered Munk found that the chyle contained not fatty acids but almost wholly neutral fat. He also showed some years later, in a human subject with a lymphatic fistula which discharged chyle, that after a meal including erucic acid the chyle contained only the glyceride erucin and not free erucic acid. Analyses of fat from the mucosa during fat absorption carried out by Moore about 50 years ago showed that this was a mixture of fat and fatty acids, and collection of chyle before it had traversed the lymphatic glands which lie along the course of the lacteals showed that the fat in these peripheral lacteals was almost wholly neutral. This indicates that resynthesis occurs in the cells of the villi.

It is interesting to recall that Munk, who had proved to his own satisfaction that free fatty acids were as well absorbed as neutral fat, believed firmly that the fatty acids were absorbed in a finely emulsified state. This was stoutly disputed by the indomitable Pflüger, but not, unfortunately, supported by any very satisfactory evidence, except the histological finding, already referred to, that fat is not detectable by staining methods in the free border of the cells of the villi. It was the discovery by Benjamin Moore of the solvent action of bile salts which to a large extent reconciled these opposite views and gave rise to what persisted as the classical view of fat absorption until a few years ago.

The Quantitative Aspect

There is one other aspect of these older experiments that I must deal with before proceeding to discuss later evidence on fat absorption, and that is the quantitative one.

The physiologist can be satisfied that what is termed the classical view of the process of fat absorption is true only if he can account satisfactorily for the whole of the fat absorbed. This has not yet been done. It would be thought to be a simple matter to collect the chyle from a thoracic-duct fistula in an animal during the whole period of the absorption of a meal containing a known amount of fat, but this has so far not been achieved. This is partly due to the inhibiting effect of general anaesthetics on fat absorption and to mechanical difficulties caused by frequent clotting of the chyle one is endeavouring to collect. Munk and Rosenstein, however, did succeed, using their patient with a lymphatic fistula in the leg, in collecting chyle for a period of 13 hours. After a meal containing 41 g. of fat, 1,134 g. of chyle were collected, and this contained 25 g. of fat—i.e., 60% of that administered. Although the chyle still contained fat, the experiment was stopped. Munk and his colleague assumed that, had the chyle been collected until fat was no longer present, an additional 6% of the fat administered might have been collected. This is the only quantitative experiment that has been recorded in which an attempt was made to give a balance-sheet accounting for the fat fed and that which passed into the thoracic duct. It has the obvious defect that the amount of fat actually absorbed was not measured. We know that olive oil is very well absorbed as a rule, and, assuming that all the chyle was being collected, for which Munk gave indirect evidence, we are left with the conclusion that about two-thirds of the fat absorbed reaches the thoracic duct via the lacteals, whereas the remaining third is unaccounted for. It has generally been assumed that it passes into the blood stream via the capillaries of the villi.

To sum up, the classical view was that fat was absorbed only after hydrolysis. The fatty acids so produced were absorbed dissolved in bile. They underwent resynthesis into neutral fat in the epithelial cells of the villi. This was then discharged into the reticular spaces of the villi and taken up by lacteals or blood capillaries. In the former case it entered the systemic blood vessels and in the latter it reached the portal blood and so passed direct to the liver.

Physiologists are perhaps more critical of classical views than are other scientists. It is not, therefore, a matter for surprise that the beliefs of twenty years ago have continually been questioned and subjected to further experimental inquiry. The result is that this classical view has been called in question and other possible mechanisms of fat absorption have been put forward.

Role of Phosphates

In 1934 Verzar and Laszt described experiments on rats which indicated that phosphates may play a part in fat absorption. Their method was to inject into the small intestine of the animals the mixtures they were testing and after six hours to withdraw them. The amount of fatty acid was estimated and compared with that introduced at the beginning, thus showing the magnitude of the absorption. There was practically no absorption when oleic acid alone was injected into the gut, but it was moderate when the fatty acid was mixed with bile acid or with bile acid and glycerol. It was nearly doubled when phosphate was added to the mixture. When glycerophosphate was used instead of phosphate then the absorption was increased still further. This suggested that esterification of glycerol by phosphoric acid may be an important factor in fat absorption.

It is known that the mucosa of the small intestine is one of the body's richest sources of the enzyme phosphatase, so that in the presence of phosphate the glycerol split off from fats in the process of digestion might undergo conversion to glycerophosphate in the cells of the villi.

Furthermore, it was shown that mono-iodoacetic acid, which inhibits the enzyme phosphatase, also inhibits the absorption of fatty acid. But this inhibition of fat absorption is still evident when the fatty acid is mixed with bile acids and glycerophosphate, so that Verzar concluded that the iodoacetic acid acts by preventing in some way the resynthesis of neutral fat in the mucosal cells rather than by preventing phosphorylation. It was shown in Verzar's laboratory that the action of lipase was not hindered by iodoacetic acid, so that a failure to hydrolyse fat did not

explain why the fat was not absorbed after administration of this substance. What seems most likely is that its action as a general cellular poison is a sufficient explanation of its prevention of fat absorption.

Verzar showed also that phlorizin prevented fat absorption in rats. This substance also inhibits the enzyme phosphatase. The doses that have to be used are very large and the complete inhibition lasts for only a few hours. Nevertheless, these experiments are more suggestive than those with iodoacetic acid that phosphorylation is an accelerating factor in fat absorption. Histological observations from Verzar's laboratory indicate that it is not the entry of fatty acids into the cells of the mucosa which is prevented, but rather the resynthesis into neutral fat and its transport away from these cells. Thus, staining methods which differentiate fat from fatty acid show that a few hours after administration of iodoacetic acid or phlorizin most of the globules or particles inside the cells of the villi consist of fatty acid, whereas normally they would be neutral fat.

If phosphorylation is an important aid to fat absorption by the villi, it probably indicates that the synthesis of lipins is an intermediate stage in the resynthesis of neutral fat.

There is, however, not much more experimental evidence on this point. Examination of the fat in the chyle has shown that it does contain a small amount of lipin, but the proportion does not exceed 10% of all the fat present.

Estimations of the lipin content of the cells of the villi during the absorption of cotton-seed oil in pigs have also been made by Reiser, but have shown no change within five hours. It has also been shown by Barnes, Miller, and Burr in rats fed with a methyl ester of the conjugated acids of corn oil, which can be estimated by spectrophotometric methods, that at a time when the absorption was maximal there was only a slight incorporation of the fatty acids administered into the lipins of the cells. This indicates that if lipin formation is essential in fat synthesis in the cell the rate of transformation of lipins into neutral fat must be very rapid.

Experiments in which phosphate containing radioactive phosphorus has been fed along with fat have shown that the isotopic phosphorus becomes incorporated in the lipins of the mucosa. But this does not provide evidence of new formation of lipins during fat absorption, because the isotope might have undergone exchange with the phosphorus of the pre-existing lipins.

We must therefore, I think, come to the conclusion that the facilitation of fat absorption by phosphate and glycerophosphate, which was demonstrated in rats by Verzar and his colleagues, has not yet led to an explanation of the mechanism by which it is brought about. The study of the lipins in the mucosa during fat absorption has certainly not given one.

The Partition Hypothesis

Other experiments which I wish to describe next have been concerned to a large extent with the fat in the blood and its relation to the processes of fat absorption. It is well known that during the absorption of fat the blood plasma has an opalescent appearance. This is due to the presence of fat in extremely fine suspension.

Under dark-ground illumination the microscopic particles of fat appear as points of light and can be counted. A method for estimating their number under standard conditions was described about ten years ago by Frazer and Stewart. The particles are called "chylomicrons," and the number present under these standard conditions we may refer to as the chylomicron count. The graph representing the change in this count with time is spoken of as a "chylomicrograph." It is obvious that unless the chylomicrons are always of the same average size a mere estimation of their number would not give an accurate indication of their weight. If, therefore, the chylomicrograph is to be used to indicate the relative amounts of fat in the blood at different times, then it must be known whether under all conditions the fat content of the blood runs parallel to the chylomicron count.

A study of the results published from Professor Frazer's laboratory shows that the count is very low during starvation, and that it rises considerably after a meal which contains fat. There is a peak about three hours after the meal. When the fatty components of the blood are estimated and the amount is compared with the count there is a rough parallelism between the two with glycerides, but not with lipins and cholesterol esters. It must therefore be borne in mind that the chylomicrograph gives no more than a qualitative indication that the amount of fat in the blood varies under different conditions. It does not allow us to estimate either the percentage variation or the absolute amount present under those different conditions.

Nevertheless, the study of chylomicrographs in relation to fat absorption has revealed several interesting facts which require explanation.

Rats were given some olive oil or the equivalent amount of oleic acid and glycerol. After olive oil the lacteals appeared milky, and the chylomicron count in the systemic blood was high, but in the portal blood it was low. With the oleic acid and glycerol the chylomicron count in the systemic blood was low, whereas that in the portal blood was high and the lacteals were relatively free from fat.

These findings suggest that in the rat, at all events, neutral fat and fatty acid are dealt with differently in the process of absorption. Additional evidence for this view was obtained by feeding stained fat or fatty acid to rats. After a week of such feeding the fat depots were deeply stained when stained fat was fed, but were not when equivalent amounts of stained fatty acid and glycerol were given. Furthermore, if rats were fed with small quantities of stained fat or fatty acid and killed five hours later the liver showed only a small amount of stained fat after feeding with fat, but a large amount after feeding with fatty acid.

From these and other observations Frazer concludes that neutral fat is absorbed direct into the intestinal cells and is passed on without change to the lacteals. On the other hand, fatty acid is absorbed into the cell by a different mechanism. It is passed into the blood capillaries of the villi and reaches the liver in the portal vein.

According to Frazer, therefore, lipolysis is *not* an essential preliminary to absorption, and neutral fat and free fatty acid can both be taken up by the intestinal cells. When they are taken up they are treated differently.

The view that some of the absorbed fat might be taken up by blood vessels in the villi and not by the lacteals does not conflict with previous evidence. It will be remembered that in Munk's quantitative experiments with the patient who had a lymphatic fistula about one-third of the fat administered was not accounted for by passage into the lacteals, and it has therefore been assumed that the pathway of this fat was the blood vessels of the villi.

What is new about the deductions drawn by Frazer and his colleagues from the comparisons they have made between the absorption of fat and fatty acids is that an unspecified amount of the fat which is absorbed in the

rat when neutral fat is administered is absorbed without previous hydrolysis in the intestinal lumen.

Histological Picture

In addition to the evidence obtained from chylomicrographs and the appearance of the lacteals, Frazer and his colleagues have drawn attention to the different histological pictures presented in the small intestine when olive oil and oleic acid are administered. With olive-oil feeding the cells are mostly occupied by large globules of fat, whereas when oleic acid is given the cells are full of much smaller particles, presumably of the fatty acid. Frazer makes the point that if fat-splitting must precede fat absorption then administration of fatty acid should produce the same histological picture as administration of neutral fat.

It is, however, a legitimate comment on this view that one might not necessarily expect to get the same histological appearances, because the conditions are not the same. In the case of olive-oil feeding, the fatty acid is liberated gradually and therefore in small concentration; when fatty acid is fed it is presented to the cells in maximum concentration ready formed. In the latter case the cells are, so to speak, swamped with fatty acid, but in the former case they may be able to deal with it in a more leisurely manner. This is the old problem of histology. To what extent are we justified in interpreting dynamic functions from static pictures? I feel that it is unsafe to draw fundamental conclusions on fat absorption from histological evidence of this kind alone.

Frazer, however, has obtained other evidence in support of his view that in absorption fat and fatty acid are treated differently by the intestinal cells.

The rate and amount of lipolysis in the intestine can be increased by adding an active preparation of lipase to the fat which is fed. When this is done in rats, the histological picture is like that obtained when a fatty acid such as oleic acid is fed—i.e., the cells are filled with fine granules. The path of absorption is also like that observed with fatty acid feeding—namely, absence of milkiness in the lacteals—and when stained fat is given along with the lipase the liver is deeply stained but not the fat depots. In addition to these observations it is found in man as well as in the rat that addition of lipase to the diet causes a considerable change in the chylomicrograph. At the peak period the chylomicron count obtained when fat is fed greatly exceeds that which results from feeding the same amount of fat with added lipase.

The reverse of this experiment has also been carried out by Frazer. This was the inhibition of the action of lipase of pancreatic juice by giving a small amount of sodium cetyl sulphate with the oil fed. This prevents the hydrolysis of fat by lipase and, in the rat, produces a histological picture like that obtained with neutral fat alone—namely, intestinal cells filled with large fat globules. Along with this the lacteals are found to be milky, and when stained fat is fed along with cetyl sulphate the fat depots are heavily stained, whereas the liver is not. This again points to lipolysis not being essential for fat absorption and different paths of absorption being followed by fats and fatty acids. In Frazer's experiments with cetyl sulphate it seems likely that inhibition of lipolysis was almost complete. That fat was absorbed in amounts which were quite normal was attributed by him to the emulsifying action of cetyl sulphate, which would be expected to produce fine particles of fat in the intestinal lumen. These could be taken up directly by the intestinal cells if his view is correct.

To my mind these experiments with cetyl sulphate provide the best evidence that has yet been put forward that, in the rat at all events, fat may be absorbed without hydrolysis if it is finely enough emulsified. Cetyl sulphate is a particularly valuable tool because, besides its surface active properties, it inhibits lipase. The fine emulsion it produces would normally lead to a more rapid action of lipase, and hence production of fatty acid. But this being prevented enables the effect of emulsification alone to be studied.

Emulsification

Emulsification, its degree of fineness, and the conditions which bring it about are very important in fat digestion and absorption. I should therefore like to say more about them at this stage.

Because fat is insoluble in water its digestion takes place at the interface between the fat globule and the surrounding medium which contains the fat-splitting enzyme. The more finely divided the fat—i.e., the more it is emulsified—the greater will be its surface area and, other things being equal, the more rapidly will it be split up into fatty acid and glycerol. According to Frazer, fine emulsification is also a prerequisite for absorption of fat in its unchanged state. It is clear, therefore, that in the small intestine there will be two competing processes for disposing of the fat which enters it from the stomach. The more finely the fat is emulsified the greater will be its chance of being split up into fatty acid and glycerol, both of which can be absorbed in solution. But, also, the greater will be its chance of being absorbed in particulate form.

We have as yet no answer to the question how much of the fat travels by what we may call the fatty acid route and how much is taken up as neutral fat. It is, however, obvious that whatever proportion, if any, is absorbed in particulate form depends almost entirely on the existence of conditions in the intestine which will facilitate the production of a very fine emulsion.

This leads us to consider what those conditions are. We are again indebted to Professor Frazer and his colleagues for some experiments that have thrown a great deal of light on them.

There is general agreement that the reaction of the contents of the small intestine varies between a *p*H of about 6.5 and 8.5. A prerequisite for particulate absorption of unchanged fat is therefore the existence of a stable, finely divided emulsion between that *p*H range. It has been shown by Frazer that, if olive oil is placed in a rat's stomach and the animal is killed three to four hours later, its small intestine contains a white emulsion of fat consisting of negatively charged particles less than 0.5 μ in diameter. The emulsion is stable for several hours.

This shows that administration of oil does provide the kind of emulsion that would be required for particulate absorption. By studying systematically the emulsifying effect on olive oil of single, paired, and triple combinations of bile salts, oleic acid, soap, glycerol monostearate, and soap formed at the oil–water interface by the reaction between oleic acid and sodium carbonate, Frazer and his collaborators found one triple combination that provided the requisite kind of stable emulsion. It consisted of bile salt, oleic acid, and glycerol monostearate. The oleic acid and monostearate were dissolved in the oil and a 1% solution of bile salt formed the aqueous phase. On mixing, emulsification was spontaneous over the *p*H range 6–8.5, the particle diameter averaged less than 0.5 μ, and the stability was all that could be desired.

It is not difficult to produce emulsions of fat in an alkaline medium, but it is when the reaction is even slightly acid, as in the duodenum; hence the special importance of this new discovery by Frazer. If this sort of combination is that used normally in the intestine, it implies that a stepwise hydrolysis of fat takes place with monoglyceride as at least one of the phases. I am not aware of any demonstration that when lipase acts on fats the three component fatty acid molecules are split off one at a time, although this might well be so. In fact, the only difficulty in accepting this three-component system as one which may be responsible for emulsification in the small intestine is the lack of experimental evidence that a monoglyceride stage exists as a phase in the action of lipase on fats. There seems to be no theoretical objection to this, so possibly in the future we may expect to see some proof of it by experimental means.

Importance of Bile

It will be observed that this work on emulsification provides a new function for bile salts and therefore emphasizes the importance of bile in the digestion and absorption of fat. All the following functions may be attributed to bile salts. In digestion they have two roles: besides increasing the surface area by aiding emulsification of fat they have an adjuvant effect on lipase itself, speeding up its action several times. In the process of absorption they are believed to play several parts. One of these is to dissolve fatty acids, probably by forming soluble complexes with them.

Wieland and Sorge have shown that one of the bile acids —deoxycholic acid—forms definite compounds with fatty acids, the so-called choleic acids. They have suggested that these acids, coupled with glycine or taurine, may therefore play a part in enabling fatty acids to enter the intestinal cells. Verzar and McDougall suggest that bile salts form a layer at the surface of the intestinal cells, where they produce water-soluble and diffusible complexes with fatty acids and so assist the entry of the latter into the cells. Finally, according to Frazer and his collaborators, they are necessary for producing the stable emulsions of fat with particles less than 0.5 μ in diameter and capable of existence in a *p*H range of 6–8.5 which are postulated as necessary for particulate absorption of fat.

In spite of this variety of ways in which bile salts assist fat absorption, they do not seem to be absolutely essential. It is one of the interesting problems of absorption why they are not.

The most trustworthy evidence for this comes from experiments on dogs in which a biliary fistula had been established. Munk has described how in animals treated in this way and fed on diets containing varying amounts of suet or lard, or, alternatively, with the fatty acids derived from them, a considerable amount of the fat or fatty acid was absorbed. The figures for the quantity of fatty acids taken up during the passage of the food through the intestine were always a little higher than those for the corresponding amount of neutral fat. Also, the lower-melting fat was absorbed better than the higher-melting one. Thus lard was absorbed to the extent of 67% and suet to 35% when the daily intake was 70 g., the corresponding figures for the fatty acids being 73% and 42%.

Other experiments on human subjects with biliary obstruction bear out these results. Schmidt, for instance, describes the findings on three cases in which the average fat utilization was 74%. In two of these the obstruction was complete.

These results leave no room for doubt that although the presence of bile in the intestine assists fat absorption it is by no means essential.

In the experiments of Frazer and his colleagues on emulsification the only stable emulsion obtained at the *p*H found in the upper part of the small intestine was obtained in the presence of bile acids and monoglyceride. These, however, could not have been present in the experiments of Munk on the absorption of fatty acids, which I have just described. It seems a reasonable conclusion, therefore, that large amounts of fat and fatty acid can be absorbed under conditions which do not fit in with those so far shown to be necessary to produce fine emulsions at the slightly acid reaction of the intestine.

I have pointed out earlier that the solvent action of bile for fatty acids was the one property which led to the abandonment of the particulate absorption theory about fifty years ago. Since so large an absorption of fat or fatty acid can take place in the absence of bile, we are led to the conclusion that some other solvent for fatty acids must be present or that some undescribed emulsifying system exists which can explain the remarkable degree of absorption obtained when bile is absent. It is important to bear in mind that the diet used by Munk in his experiments was a mixed one and contained a large proportion of meat. Possibly digestion products of protein and especially amino-acids in high concentration may assist in emulsification, or in stabilizing emulsions, or in actually combining loosely with fatty acids so as to assist their absorption. This must remain a speculation, however, until experimental evidence about it can be obtained.

Absorption of Paraffin

One other set of recent experiments on the absorption of oil emulsions is of importance. It is the work of Frazer, Schulman, and Stewart on the absorption in the rat intestine of emulsions of paraffin. These observers found that 50% emulsions of liquid paraffin stabilized with cholesterol and sodium oleate or sodium cetyl sulphate could be prepared with an average particle diameter of 0.5 μ or less. These when introduced direct into the rat's intestine were absorbed to the extent of 36 to 43% in a period of six hours. It will be observed that no bile salt was used in making these emulsions, so these experiments show again that bile is not essential for absorption of fine emulsions. With coarser emulsions, in which many particles had a diameter of 1 to 2 μ or more, the absorption was very much reduced.

These experiments show that, provided an oil emulsion is finely enough dispersed, it can be absorbed in the rat's small intestine. Some alarm has been expressed on this account at the use of medicinal paraffin as a medicament and in cooking. It has been suggested that if paraffin is absorbed it would tend to accumulate in the body in undesirable situations, since it is not oxidizable, or, if it is, then only with great difficulty. So far as I am aware, no evidence has been produced that the fine dispersion of paraffin which Frazer and his colleagues have shown to be necessary before absorption can take place is obtained when the oil is taken by mouth in the normal way. On the experimental side it may also be recorded that Channon and Collinson many years ago gave 100 ml. of emulsified paraffin daily to a pig for 54 days. On extraction of the fatty substances from its liver 2.2 g. of unsaponifiable material was obtained, which was possibly derived from the 5.4 litres of oil that had been administered. This does not suggest that absorption of paraffin takes place in an amount that would be of material importance.

Steatorrhoea

A final topic that must be considered briefly is whether diseases involving defects in fat absorption have taught us anything about the physiology of the process. In certain fields of physiology it is true that a study of disease has helped to throw light on physiological processes, but that can hardly be said of disorders in which fat absorption is at fault. It is true that biliary obstruction causes steatorrhoea, but that fact has not explained the reason why. Similarly, pancreatic disease, or in extreme cases complete pancreatic obstruction, interferes with fat absorption.

Those who uphold what I have termed the classical view of the mechanism of fat absorption would state that this was due to defective hydrolysis of fat caused by the partial or complete deficiency of pancreatic lipase. That would seem to be a satisfactory explanation. At first sight it also counters the modern view that fine emulsification is all that is necessary in order that fat absorption may take place. But we have to remember that the failure of both bile and pancreatic juice to enter the small intestine may result in the non-production of the necessary conditions for that fine dispersion of fat which is regarded as essential for its absorption. Hence the faulty absorption which is associated with diseases of the pancreas and bile ducts has not helped in explaining the mechanism which we wish to have made clear.

Another disease in which steatorrhoea occurs is tropical sprue. I am indebted to my colleague Dr. D. A. K. Black for his views on the defective fat absorption which is a well-known sign in this condition. First, there is no evidence of a selective failure of fat absorption. The steatorrhoea seems to be part of a general impairment of absorption. This in itself does not help us in our search for the true mechanism of the absorption process. Secondly, the percentage absorption of fat does not vary with the amount of fat in the diet. In five patients, for instance, whose daily fat intake was increased from 65 g. to 95 g. the percentage absorbed did not show any significant change. This does give a clue to the kind of mechanism which is involved. The defect cannot be a purely physical one, otherwise the absolute amount of fat absorbed would not depend on the quantity in the diet. Thus some biochemical defect, such as one in the enzyme systems concerned in fat absorption, is indicated. It is interesting that Munk, in his studies of fat absorption in dogs, in the absence of bile found a similar relationship to hold, provided that the normal capacity for dealing with fat was not exceeded.

A third discovery which Black and his colleagues made is in harmony with the view that the defect in tropical sprue is a biochemical one—that is, that administration of yeast extract in this condition has a favourable influence on fat absorption. This suggests that some accessory food factor is possibly lacking. Apparently it is not nicotinic acid, riboflavin, or folic acid. Its identity, therefore, if there is any truth in this suggestion, still remains to be discovered.

Conclusion

Perhaps I have said enough to show that I regard the processes of fat absorption as still not completely understood. The intelligent use of some of the new isotopes which the physicists are now putting into our hands could undoubtedly help in solving some of the outstanding problems, and I hope that in due course these new methods may be made use of. I can certainly commend to any young physiologist the study of fat absorption as well worthy of his attention.

Bibliography

Barnes, R. H., Miller, E. S., and Burr, G. O. (1941). *J. biol. Chem.*, **140**, 233.
Black, D. A. K., Bound, J. P., and Fourman, L. P. R. (1947). *Quart. J. Med.*, n.s. **16**, 99.
Bloor, W. R. (1943). *Biochemistry of the Fatty Acids*. Reinhold, New York.
Channon, H. J., and Collinson, G. A. (1929). *Biochem. J.*, **23**, 676.
Frazer, A. C. (1943). *J. Physiol.*, **102**, 306, 329.
—— Schulman, J. H., and Stewart, H. C. (1944). Ibid., **103**, 306.
—— and Stewart, H. C. (1938). Ibid., **94**, Proc. 24.
—— —— (1939). Ibid., **95**, Proc. 21, 23.
Fries, B. A., Ruben, S., Perlman, I., and Chaikoff, I. L. (1938). *J. biol. Chem.*, **123**, 587.
Moore, B., and Parker, W. H. (1901). *Proc. roy. Soc. B.* **68**, 64.
Munk, I. (1884). *Arch. path. Anat. Physiol.*, **95**, 407.
—— and Rosenstein, A. (1891). Ibid., **123**, 230, 484.
Reiser, R. (1942). *J. biol. Chem.*, **143**, 109.
Schmidt, A. (1906). In Von Noorden's *Handbuch der Pathologie der Stoffwechsels*, 2nd ed., vol. 1, p. 699. Berlin.
Verzar, F., and McDougall, E. J. (1936). *Absorption from the Intestine*. Longmans, London.
Wieland, H., and Sorge, H. (1916). *Hoppe-Seyl. Z.*, **97**, 1.

MODERN TRENDS IN RADIOLOGY*

BY

JAMES F. BRAILSFORD, M.D., Ph.D., F.R.C.P. F.I.C.S.

Director of Radiological Studies in Living Anatomy, University of Birmingham

In this paper it is my intention to stimulate thought by taking stock and critically examining the prevailing tendencies and so obtain a perspective which will enable us to see where we are going.

The radiological age may be divided into three periods —(1) that which heralded the advent of radiology ; (2) the period of distrust ; (3) the period of idolization—the modern trends.

When Roentgen's remarkable discovery was made known to the world, the Press (Brailsford, 1946a)—both medical and lay—heralded it as a means of sparing patients not only the pain associated with disease but also that which was, and still is, inflicted when other methods of examination are conducted. First impressions are often the most important and deserve the fullest consideration, and these first impressions were so strong that they stimulated radiological research throughout the world to such a degree that during the year 1896 most of the possibilities of radiology were envisaged, techniques developed, and explorations begun. Continuous progress since then has been essentially refinement of technique, concomitant with ever-improving equipment. Unfortunately many enthusiastic workers in the earlier years did not preserve the scientific accuracy in their observations that is so essential for progress. Because interpretations were read into radiographs which were far in excess of what was reasonably possible —a tendency which has not been entirely overcome—clinicians were taught to distrust radiology ; but the more careful workers in radiology, by painstaking study of the normal and by correlation with pathology, convinced clinicians that they could render much help in the elucidation of clinical problems. Some radiological evidence is self-explanatory even to the layman, and this has resulted in the misconception amongst the inexperienced, both qualified and unqualified, that all radiographs are self-explanatory. In the light of the previous high standard of clinical medicine it is amazing that this serious misconception,

*An Address given at a Special Meeting at the College of Physicians of Philadelphia, October 22, 1948, and later at other University Medical Centres of the United States.

associated as it is with the five following very remarkable omissions, should have been allowed to prevail.

Omissions in Medical Practice

(1) Failure to realize the importance of, and to carry out, a thorough clinical examination before any radiology—radiology being regarded as an easily obtained substitute requiring little personal effort. On the serious errors in diagnosis and treatment which this has occasioned a great deal could be written. Careful attention to the clinical condition of the patients in these cases would have spared them much mental and physical pain, and the clinicians the blame the fruits of which they escape perhaps too often. There would be fewer errors in the interpretation of radiographs if radiology was always preceded by a sound clinical examination: if one of these must be omitted the least harm will come from omission of the radiography and most from omission of the clinical examination.

(2) There has been a failure to learn the bounds and appearances of the normal, and even the character of the artifacts produced by faulty material and techniques. Radiographic methods have been applied to the examination of structures made visible by contrast media, and operations have been conducted to remedy "defects" long before the appearances of the normal have been learnt: when sound knowledge of the normal has with time and experience been acquired the operative measures for the correction of some of the "defects" have been abolished. This was very noticeable in gastro-intestinal radiology. I am confident that in the realms of other specialties, notably thoracic surgery and neurosurgery, the same sequence will occur, for in these our knowledge of radiology, with and without contrast media, is still inadequate and incomplete; yet surgical explorations based upon the radiology are many.

(3) It is often not realized that the initial changes in many conditions are indistinguishable from one another, and that serial radiographs with continuous clinical examinations over a short or long period may be necessary for elucidating a problem.

(4) Many have failed to appreciate that the onset of disease is not associated with immediate changes in the radiographic appearances, and that it requires time—what I have called "the latent negative radiographic period," sometimes only a few days, but sometimes a year or more (Brailsford, 1946b)—before the changes are sufficient to produce enough contrast density or irregularity of contour to alter the radiographic appearances from the normal; by the time these changes are recognizable they are extensive—in some conditions more extensive than the radiographs suggest—in some cases healing may have commenced. Even fractures and other more serious conditions of bones and joints may be masked, if displacement has not resulted, until secondary changes have developed.

(5) There has been a failure to realize that, though the disease has ceased its activity, the radiograph may show spectacular appearances even to the end of an apparently normal life—the positive radiographic symptomless period. It is questionable whether surgical measures with their attendant risks would be so often undertaken if the full importance of this were understood. In some cases failure to appreciate omissions 4 and 5 have, on the other hand, led to the disregard of active clinical signs or recent injury when radiographs have shown no sign of change or only the typical evidence of old healed lesions. You may ask what evidence I have of these omissions. I believe you could obtain such evidence from the activities in many hospitals, but the strongest evidence is in the boosting of mass radiography.

Mass Radiography

I have recorded elsewhere (Brailsford, 1945a, 1948a) the serious limitations, erroneous interpretations, and liabilities of mass radiography and the relative poverty of its contributions to preventive medicine. Undoubtedly it has an important propaganda value, but it is the propaganda of fear by which the public—yes, and the medical students—are being frightened into the erroneous belief that active progressive disease is symptomless and only the radiograph can reveal it. It can be proved to have been responsible for the infliction of much unnecessary mental and physical pain.

Mass surveys are essentially bureaucratic regimentation measures designed by officials and enthusiasts who appear not to have the knowledge of the five omissions or the experience to judge the efficiency of the measures adopted, and, while they themselves are spared the rigours and anxieties of the general practitioners attending to the sick, would decry the contributions of these latter doctors to the reduction of the incidence and mortality from tuberculosis. Mass radiography has not added anything new to our knowledge of radiography of the chest. The evidence obtained by it has been used to re-emphasize the fact that about 4 per 1,000 of the population have signs of active tuberculosis; but not enough importance has been placed on the other confirmatory evidence it has yielded—i.e., that at least ten times as many persons, or 40 per 1,000, have had fairly extensive disease and recovered from it without knowing of its existence and in most cases without having lost time from work. Had radiography been applied to all these at the stage when the appearances suggested activity it would have inflicted on them the dreaded stigma of tuberculosis and seriously interfered with their lives without contributing any good. A little reasonable education in hygiene would have accomplished much more, at less expense in money, equipment, buildings, personnel, and above all in feelings.

Because there would appear to be conditions of medical service which permit certain cases of pulmonary tuberculosis to be overlooked by medical officers is an indication not that the progressive disease is symptomless but that the clinical examinations are poor; for when such patients return home the diagnosis is made by the parents, confirmed as grave by the general practitioner, and registered as deadly by the consultant a few days before death. The greater the percentage of cases of unknown progressive tuberculosis discovered by mass radiography, the poorer the clinical medicine that has been applied.

Spectacular radiographic evidence of tuberculosis, as well as other conditions, may persist for many years, during which it is symptomless because it is quiescent or healed and of little importance from the point of view of infection. The most successful surgical results have been obtained in cases which have previously healed themselves and are symptomless. Reversal of the radiographs—i.e., showing the last in the series first and the first last—is worth doing, for it will often indicate what appears to be a miraculous cure, particularly when the series includes a number of radiographs taken at intervals in the early days, during which no change occurred prior to the surgery.

I find it difficult to reconcile the views of modern clinicians on tuberculosis. If one examines the serial post-operative radiographs, tries to evaluate the risks run by the patients, and compares the end-radiograph with the

one which incited the surgery, one finds it difficult to believe that the latest radiograph satisfies, or that it justifies the measures adopted. If the inciting radiographic features were unaccompanied by signs and symptoms these post-operative radiographic appearances of mutilations are certainly not without them. There would appear to be no more justification for removing a healed or quiescent lesion of the lung (which would not have been suspected if there had been no radiograph) than of any other structure, or in fact for removing any normal tissue; since valuable healthy lung is removed.

Though patients derive great benefit in those sanatoria where mental and physical rest, good fresh air, and food are the essential characteristics of treatment, they have to return to the debilitating influences of the poor home which broke down their resistance. The best place to treat tuberculosis is the home, and only those efforts which are designed to make the latter fit for living in are likely to cut out tuberculosis effectively and permanently. The best preventive medicine is that aimed at prevention, not that which is aimed at treatment of disease that could have been prevented. The lack of sincerity and fairness in this propaganda is shown in the recent report of the Brookings Research Institute, which states that tuberculosis is three times more prevalent in coloured than in white people and syphilis six times more common. The unfortunate individual labelled as tuberculous is subjected to all the disadvantages which the stigma of this disease brings—i.e., inability to insure, estranged social and business contacts, and other serious interferences with life and liberty; whereas the stigma of syphilis, the loathsome contagious disease to which innocent persons can be subjected, is treated with all privacy, though with effective measures it could be stamped out.

Radiography and Clinical Medicine

In spite of all these drawbacks to mass radiography of the chest I believe it could be used for the groups I have enumerated. But there are signs that the degeneration of clinical medicine is spreading with the aid and at the expense of radiology: it will ultimately bring radiology into disrepute. In a recent English newspaper it was stated that "one in every 20 people in Britain—or over 2,000,000—suffers from rheumatism. So it has been decided to mass-radiograph the joints of groups to ascertain the extent of the disease. When the unit is in operation it is proposed that every one of the 73,000 miners in the area will be *x*-rayed whether he has rheumatism or not." As pointed out by an orthopaedic surgeon in a letter of appreciation of my opposition to this type of activity, "The whole thing is really an attempt on the part of some people to increase the number of attendances of their patients to astronomical figures and to increase similarly the work of other departments, and on the strength of this to increase the number of staff. The result of this is, of course, that with a very large staff the man in charge must be a very great person."

Mass radiography of the stomach is being used in one famous American hospital (surprisingly enough, in one to which a former physician brought great fame by his contributions to clinical medicine) for the detection of early malignant disease, and claims have been made of tests which reveal its presence. This might well incite further extensive mass radiological investigations. I believe one's energies in this direction could favourably be reserved until a cure for malignant disease has been discovered; then it could be applied enthusiastically with all skill.

There are other spheres in which the use of radiology not only fails to spare the patient pain but actually incites the infliction of pain by the performance of investigations, including surgery, which can be regarded as little else than meddlesome. I heard a professor of medicine at one of the universities urge that ventriculography was a useful, harmless, and painless method of investigating the cause of headaches. I saw the exhibition of radiographs of a patient with three aneurysms of the aorta, one of which showed radiographic evidence of erosion of the sternum and ribs. This patient sought the doctor because he had pain, and it should be our first duty to relieve that pain; yet this evidence did not incite the observer to pity, but to inject the aneurysm with opaque media to provide spectacular evidence of the extent of the lesions—knowledge which could not be of the slightest use to the patient, but which apparently satisfied the callous inquisitor.

Radiology in the Curriculum

Radiology is being brought increasingly into the medical curriculum. Unfortunately, I repeat, its chief use appears to be to obtain quick answers with the least effort on the part of those demanding it. It has been brought into the study of anatomy. Instead of realizing that it merely gives additional information, and in no way diminishes the need for training in the dissecting-room, we find the hours devoted to anatomy and the basic science being reduced to provide time for specialized subjects. Students are being taught to be "scientists" and not doctors. The truth of this is seen in the difficulty in getting young men to practise in the country, where they have not at their elbow *x*-ray equipment and laboratory services, on which they have been taught to depend. To provide them with these facilities is not the answer for good clinical medicine, since their training in this has been ineffective and in these specialized fields but superficial. Recently I was amazed to hear that a medical student, induced by a spectacular film on rehabilitation to give up the doctor's course and take up physiotherapy, had been told by the Physiotherapy Society that the university course in anatomy was not of a sufficiently high standard to permit of exemption from their preliminary examination in anatomy. Surely the medical course ought to be superior to that used by any auxiliary medical services, for the work of the latter must necessarily be under the direction of the doctor, and any contribution which radiology makes to this down-grading in training should be eliminated. I know that radiologists are called upon every day to demonstrate not less but more anatomical structure, and we do it at the demand of the clinician. More attention to anatomy may deprive the student of hours of specialized scientific research, but it might spare him (and the patients) the pain expended in unnecessary investigations of little use in treatment.

At a recent discussion on the role of radiology in the teaching of anatomy it was stated that, while it was reasonable to give students barium meals and allow their colleagues to study the passage throughout the alimentary canal, it was not considered reasonable to allow their colleagues to inflict barium enemata upon them. I urged that as a teacher I felt it was a duty to teach the subject in a manner that the students would not forget, and therefore it might be a good thing if they performed upon one another every type of injection, including ventriculography, myelography, arteriography, etc. In this way they would be taught in an indelible manner by the unskilful hands of their colleagues just what such examinations mean to the patient. It might cause them to consider the patient and to insist on skill and the reservation of such investigations to the last resort, after all other investigations had

been made and it could be reasonably thought that such investigations would be of value.

If after a thorough clinical examination by an experienced clinician, assisted by such plain radiography as that indicated, it is thought that injection of opaque media would help in the treatment of the patient's condition, I am of the opinion that that injection should be done by the clinician desiring the information—presuming, of course, that the latter has sufficiently studied the technique and acquired the necessary skill. It is probably on the evidence so obtained that operative or other treatment will be employed; therefore it must be done with every care and with skill, recognizing the great responsibility. Too frequently it is left to inexperienced house-men, as will be seen from radiographic studies of the results; these are often vitiated by faulty techniques unskilfully applied and therefore useless. Such injections should not be given merely to obtain "a pretty picture" or to satisfy curiosity, for they are done at the expense of mental and physical pain and unknown risk to the patient, who has come to us trusting in our faith and high calling to relieve pain. Scientific data are too frequently sought at the expense of human and animal pain and sacrifice. In the long run this action can result in atrocities, cruelties, or licensed murders, as we have learned from the report of Czechoslovak doctors on medical atrocities in prison camps. Little credit is due to those who would "wade through slaughter to a throne, and shut the gates of mercy on mankind."

By radiography we can now ascertain the nature of the majority of bone tumours (Brailsford, 1948c); we can say whether they are due to developmental irregularities, deficiencies, or endocrine disorders, to trauma, inflammation, or neoplasm. Regarding the last-named, we can recognize the usual simple tumours, and by serial radiography and continuous clinical observation determine in a large proportion of such cases whether malignancy exists. All this we can do without inflicting any pain, and the more attention we pay to such radiography the fewer will be the cases which we fail to diagnose. There is a modern tendency to cut down and explore every bone tumour. Spectacular radiographic appearances are allowed to incite this activity even when they are discovered accidentally during other investigations, and such radiography is doing more harm than good. There seems to be a widespread erroneous belief that the last word in the diagnosis of bone tumours can be obtained by histological examination. We can show (Brailsford, 1948b) that, given adequate study, radiology offers greater accuracy and that the infliction of biopsy with all its risks is unnecessary and of little value.

Radiology is a whole-time study, and the careful radiologist will discover something new each day, so infinite are the variations of and departures from the normal. To say that we have not seen a certain thing, and by so doing imply that it does not exist, is not a testimony to great experience but a confession of ignorance. The chances are, as my experience shows, that within a few days or weeks an example or examples of such a condition will occur in practice, and many more will probably be found in the literature. In a previous paper (Brailsford, 1945b) I have recorded the abuses to which radiology is put; they still continue.

A Modern Tendency

There is a modern trend for the members of various specialties to gather together and seclude the radiographs illustrating conditions with which they deal, and the *x*-ray departments and hospitals are so much the poorer because this valuable material is lost to the general use of the hospital and the special use of the radiologist. Radiology knows no bounds of specialization. The radiograph is a measure of the relative density and a record of the contrast outlines and structures of all tissues on and between the two skin surfaces which bound the area. We therefore need radiologists who understand all the evidence presented to inspect the whole, for there is a tendency on the part of specialists to be obsessed by evidence which appears to involve their specialty. Only good can come from whole-hearted co-operation, but harm will result to patients from seclusion and isolated activities, for which the responsible person may be called upon to bear the blame.

Requests for *x*-ray examinations are made on forms which have a space with some such heading as "Conditions revealed by the clinical examination on which radiological evidence is required." Those clinicians who co-operate and desire all the help which the radiologist can give, the men who really taught me my radiology, fill in this space with facts gleaned from the clinical examination that are invaluable to the radiologist. Those men who ape a knowledge of radiographic technique and want the radiographs, but no assistance otherwise, use this space for giving instructions with certain cryptic signs, designed to impress the radiologist with their great knowledge of radiographic technique, such as, "A.P. and L.," and if they wish to display their profound knowledge they add also, "P.A. and oblique." Such requests fail to convey any suggestion of confidence in the radiologist, and certainly do not invite him to share the responsibility; consequently he loses the stimulus for good work and the patient suffers accordingly from the defective interpretation of the radiographs.

Radiography, together with other ancillary services to clinical medicine, is being used extravagantly and is one of the chief contributors to the increased cost of medical service.

An American Experience

During my tour of the United States I went into one large department and was shown the latest and most expensive equipment operated in conjunction with a photo-electric cell, the latter replacing the brain of the technician. The films were processed in an automatic developing unit, from which they issued as a finished product. I asked to be shown the next unit, and in reply to the question, "What is that?" gave the answer, "The machine for turning out the reports." "Take a seat and wait a few minutes," I was instructed; "I think we can show you that." A junior member of the staff appeared a few minutes later, took out a stamping-machine from a cupboard, and began to stamp a large pack of reports. One of these was handed to me with the remark, "Does that satisfy you?" The report sheet with the name of the patient had been stamped with the report "Normal" and the radiologist's signature. On inquiry I was told that about 80–90% of the reports were of this nature. I said, "Now, this is interesting, for I have just come from San Francisco, where the President of the North American Radiological Society gave an address in which he said that three of the leading radiologists of America had examined a large series of radiographs and their reports showed a difference of opinion amounting to something like 30%." I asked whether it would not be better simply to stamp all the reports "Normal," for then we should have a discrepancy of only between 10 and 20%; or would it not be advisable to avoid radiology

entirely owing to its expense: probably the best thing would be for clinicians to use radiology intelligently and thus cut down hospital expenses and treatment of the patient.

Radiology an Aid to Study

It is thought, by those least qualified to judge, that radiological knowledge is now so general that there is no need for anyone to specialize in radiology. But is not clinical medicine or surgery a full-time study, leaving little or no time to acquire adequate knowledge of radiology? I would remind you of the valuable contributions which were made to medicine and surgery before the advent of radiology, when clinical medicine was unhampered by multiple ancillary departments. There is a tendency to-day to desire quantity rather than quality; to report on 1,000 incompletely investigated cases in which calls have been made on all ancillary departments, rather than on one case after careful clinical examination over a period. Sir James Paget studied one case of osteitis deformans during the 20 years of its development and then described it. His description is as valuable to-day as when he contributed it. He had not the advantages, perhaps the disadvantages, of distraction of the ancillary services of radiology, biochemistry, etc., yet his description of his one case was so complete that little has since been added to our knowledge of that disease by many who have made great demands on these ancillary services in the investigation of many thousands of cases.

Radiology is now recognized as an essential aid to the study of anatomy, physiology, pathology, clinical medicine, surgery, and midwifery, and medical students must now be taught something of its possibilities throughout their university studies. This will result in a better and more complete knowledge of the possibilities of radiology, but this wider knowledge will mean that the radiologist, if he is to retain his high status and earn and keep the respect of his colleagues, must shoulder greater responsibilities and acquire an ever-increasing knowledge, for he can claim to be the general practitioner of the specialists. He should be in a position satisfactorily to render full co-operation to each.

Conclusion

It is fitting that in this City of Brotherly Love one should preach the gospel that radiology attains its highest perfection in the contribution to the relief of human suffering only when it is directed to spare the patient pain.

Wilhelm Konrad Roentgen (Brailsford, 1946b) was a man with sagacity and great ability. His observations were keen and extremely critical; he recorded them clearly, concisely, yet exhaustively, and with scrupulous care. His modesty, honesty, sincerity, and integrity to his science and his friends helped to secure his immortality. We follow in the footsteps of a great master, and it is fitting that I should end with the words of your great countryman:

> "Lives of great men all remind us
> We can make our lives sublime,
> And, departing, leave behind us
> Footprints in the sands of time."

References

Brailsford, J. F. (1945a). *Lancet*, **2**, 808.
—— (1945b). *Brit. J. Radiol.*, n.s. **18**, 249.
—— (1946a). *Ibid.*, n.s. **19**, 453.
—— (1946b). *Practitioner*, **157**, 200
—— (1948a). *Lancet*, **1**, 498.
—— (1948b). *Proc. R. Soc. Med.*, **41**, 235.
—— (1948c). *The Radiology of Bones and Joints*, 4th ed. Churchill, London.

VALUE OF SPHINCTER-PRESERVING OPERATIONS IN CANCER OF RECTUM

WITH SPECIAL REFERENCE TO RECONSTRUCTIVE ABDOMINO-PERINEAL EXCISION

BY

STANLEY O. AYLETT, M.B., B.S., B.Sc., F.R.C.S.

Surgeon, Metropolitan Hospital; Assistant Surgeon, Westminster Hospital (Gordon Hospital)

In 1908 Ernest Miles published the details of his operation for cancer of the rectum. Based as it was on close anatomical studies of the potential zones of spread of the disease, the abdomino-perineal excision came to be regarded as the standard operation for the treatment of cancer affecting any part of the bowel between the lower sigmoid and the anal canal. No limitation of the excision was regarded as permissible, no matter at what level the growth was sited, and it is only in recent years that doubt has been cast on the necessity for sacrificing the sphincter mechanism in those cases in which the neoplasm lies above this region.

Surgery in this country has remained very true to the teachings of the great master of proctology, and little has been published in the English journals in favour of sphincter-preserving operations. But in America much has been written and many divergent views have been expressed, and as great a surgeon as Rankin (1947) has said, in condemning all such operative procedures: "Sphincter-saving operations are little more than local excisions for cancer below the peritoneum. I had thought that the question of colostomy had been definitely settled 20 years ago, but apparently a new generation insists on a re-exploration of an already discredited field." On the other hand, Babcock (1932) and Bacon (1945) champion such operations in the majority of cases. Lynch (1945) goes so far as to say, in commenting upon recent pathological investigations: "It permits one to discard entirely such radical and unnecessary operations as that popularized by Miles."

Perhaps a far more acceptable opinion is that of Wangensteen (1947), who has recently said: "A tempered ambition to save the rectal sphincter, as well as to cure the cancer, is a praiseworthy objective in suitable cases of cancer of the upper rectal ampulla."

Support for this point of view is to be found in the follow-up figures of Babcock, in which, of over 80 patients considered suitable for a sphincter-preserving operation, 50% survived disease-free for five or more years. Such figures can hold comparison with any series in which the wider abdomino-perineal operation has been performed for similarly sited growths.

Until the late 'thirties the idea of sphincter-preserving operations had lain largely dormant for three decades. Before Miles came to tower over his contemporaries limited excisions and anastomoses had been explored by the great surgeons of the latter end of the last century and the beginning of this. But enthusiasm for their methods was quieted by the logic of the great man. Maunsell (1892) had described a combined abdominal and anal approach in which continuity was achieved after excision of the rectal growth. Balfour (1910) described C. W. Mayo's method of resection and anastomosis, again by a similar approach, but these very limited excisions were rightly relegated to the past. Later, Lockhart-Mummery (1934)

employed a method of restoration of continuity, but abandoned it as being too limited in its extent.

Lymphatic Spread in Rectal Cancer

What, then, has caused this controversy to break out once again? In 1935 Gabriel, Dukes, and Bussey published their paper on the lymphatic spread in cancer of the rectum. In 1938 Gilchrist and David published a similar work, and in 1940 Coller, Kay, and MacIntyre studied the regional metastasis in this disease.

From these and similar papers it appears that the downward and lateral spread of the disease had been overemphasized by Miles. In those cases in which the neoplasm is sited from 6 to 7 cm. or more above the anal orifice such spread occurs only in a late stage of the disease, when the haemorrhoidal lymphatics are already blocked by metastases and when the progress of the cancer has reached an advanced stage. It thus appears that, provided the upward zone of spread can be eradicated, and provided a suitable length of bowel is resected below the macroscopic margin of the tumour, a radical removal of the area of lymphatic spread can be performed with sphincter salvage and avoidance of a colostomy.

With regard to the submucous spread of the disease below the margin of the tumour, most pathological opinion is that it is very limited, and, indeed, such opinion was held by Miles (1936) as well. Black and Waugh (1948) suggest that it extends only to a maximum of 3 mm. from the tumour edge, but it is generally regarded as more extensive than this.

Nevertheless, the interpretation of these pathological findings must be correlated with the post-operative history of the patients. To his cost Wangensteen (1945) has found this out, and he has said: "Whereas Coller and his associates failed to find evidence of lateral lymphatic spread in lesions lying more than 3 cm. above the ano-rectal line, I am convinced from the experience with low-lying fixed lesions that an operation which does not excise the levatores ani in juxtaposition to the bowel invites recurrence."

Sphincter-preserving Operation

However, in selected cases a sphincter-preserving operation seems likely to carry as good a chance of recovery as the more extensive abdomino-perineal excision. Such an operation does not mean a local excision. The upward extent of removal must be as wide as in the operation of Miles. The clearance of pelvic peritoneum and underlying fascia, the removal of the tissues behind the rectum lying between it and the sacrum, and the excision of as much of the diaphragmatic portion of the levatores ani complex as is possible must all be included in the dissection.

It is for these reasons that I do not regard an anterior resection operation as radical enough in its extent. Babcock's operation fulfils all the anatomical requirements, but the interference with the sphincters at the time of operation is, I believe, something to be avoided if that can be achieved.

Removal by the combined abdominal and perineal routes, with primary suture of the bowel at the time of operation and leaving the sphincter mechanism untouched, is, I believe, the best approach. Reconstructive abdomino-perineal excision of the rectum undoubtedly leaves the patient with good faecal control.

In America this procedure was first suggested by Pratt (1938), and no doubt it has been tried by some proctologists in this country. It is not widely known, and is deserving of further record. In addition, certain modifications of the technique are worth emphasis.

Indications for the Operation: (1) The lower palpable margin of the neoplasm must be at least 7–8 cm. from the anal verge. (2) At operation there must be no evidence of extensive extramural spread. (3) If secondary deposits are present in the liver, or if there are advanced metastases in the aortic nodes, the sphincter-preserving operation is the one of choice. It offers the patient the greatest comfort in his remaining span of life.

Operative Technique

Ten days before the main operation transverse colostomy is desirable. In any case, if not performed before the main procedure it should be carried out at the end of the abdominal part of this operation. Faecal contamination of the perineal wound is thereby avoided should there be any breakdown in the perineal anastomosis. The remaining pre-operative preparation of the patient is the routine employed prior to Miles's operation.

Immediately before the operation an assistant passes a short sigmoidoscope and packs the rectum below the growth with cotton-wool soaked in 1 in 1,000 perchloride of mercury. This is an important detail. There is no doubt that during the manipulations of the rectum through the abdominal incision small portions of a friable growth may be broken off. When the rectum is subsequently excised through the perineum these small fragments may become implanted in the line of the anastomosis, giving rise to what is apparently a local recurrence. By packing the rectum with cotton-wool the small fragments of growth are held up and prevented from contaminating that area of the bowel through which the resection is going to be carried out.

The initial stages of the operation are those of the abdomino-perineal excision. A left paramedian incision is preferable in view of the fact that mobilization of the descending colon to a higher level is required. The pelvic peritoneum is incised in routine fashion and the rectum separated from the bladder, from the sacrum, and, by dividing the lateral ligaments, from the lateral pelvic walls.

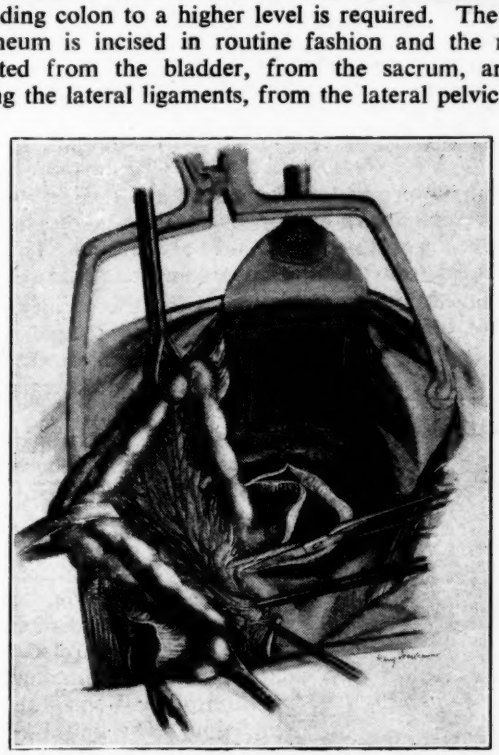


FIG. 1.—Composite plate showing the division of the mesocolon after mobilization of the bowel. The division is carried out as far as the mesocolic margin of the pelvic colon.

The vascular supply to the lower pelvic colon and rectum is then divided. Vascular anatomy in this area varies, but the main ligature is usually placed around the inferior mesenteric artery below its first sigmoid branch. The mesocolon is divided outwards close to the remaining vascular channel upon which the blood supply of the proximal colon is to depend. The division extends as far out as the margin of the bowel (Fig. 1).

The descending colon is then reflected inwards after incising the peritoneum, if necessary as high as the splenic flexure. This inward reflection of the gut gives small though valuable increases in downward mobilization. Division of the fibro-fatty bands amongst the arterial arcades of the mesocolon gives further mobility when required. It is essential that that point of the pelvic colon opposite the divided mesocolon is freed sufficiently to permit its reaching down as far as the coccyx without undue tension. The mobilized bowel is pushed down into the pelvis and the pelvic peritoneal floor re-established. This is carefully sutured around the emerging loop of pelvic colon (Fig. 2). The abdomen is closed.

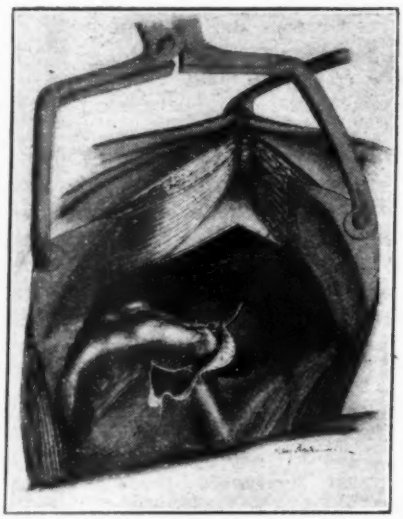


Fig. 2.—The mobilized bowel has been packed into the pelvic cavity and the pelvic peritoneal floor is being re-established. It is sutured around the emerging loop of pelvic colon.

The patient is now turned into the right lateral position. A curved skin incision is made extending from the posterior margin of the anal orifice to the level of the lower sacral segment. The flap is reflected downwards. The sacrococcygeal joint is then identified and a knife pushed into this. The coccyx is severed from its sacral attachments, and by continuing the sweep of the knife forward, first in the upper part of the wound and then in the lower, the corresponding posterior halves of the diaphragmatic portion of the levatores ani muscle are severed. The coccyx is separated from its attachments and removed (Fig. 3).

The bowel is then drawn out from the perineal wound with ease. In the distal end of the wound, the pubo-rectalis muscle is identified, curving in sling fashion around the rectum and merging intimately with the internal sphincter. A crushing-clamp is placed across the bowel, at least 3 cm. below the lowest palpable margin of the growth. The bowel is divided below this clamp, between it and the internal sphincter complex, with diathermy. A spring clamp is placed on the pelvic colon, proximal to the line of division of the mesocolon. The bowel is divided between this and a crushing clamp placed distal to it (Fig. 4). A few cuts with the knife separate any remaining attachments of the divided posterior portions of the levatores ani, and the excised bowel, with its attached tissues, is freed. A specimen removed by the operation is shown in Fig. 5.

Fig. 3.—The curved skin flap has been turned down and the coccyx removed.

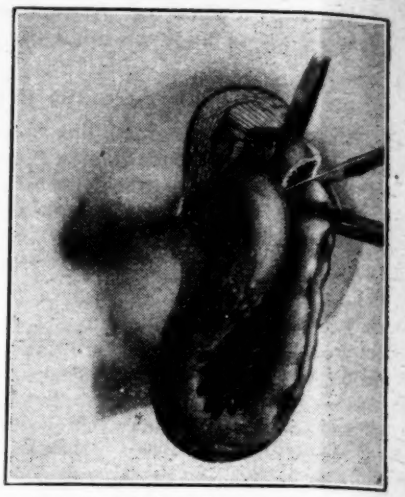


Fig. 4.—The mobilized bowel has been brought out of the wound and the resection is proceeding.

It remains to anastomose the ano-rectal stump with the distal end of the pelvic colon. The latter is of course covered with peritoneum, but the former has no such protective covering. Anastomosis in two layers, with subsequent reinforcing sutures, must be carried out with exacting care (Fig. 6). For the first layer of sutures, anastomosing the anterior fibro-muscular rectal wall to the anterior sero-muscular layer of the pelvic colon, interrupted thread sutures are best. A continuous catgut suture is then used. This passes through all layers of the opposed edges of the two ends of the gut and, on completion, continuity of the lumen of the bowel is restored. The second layer of the posterior part of the anastomosis is also made with interrupted thread sutures.

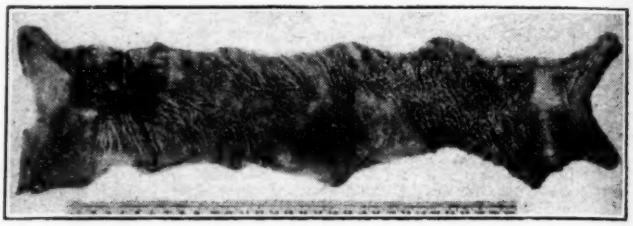


Fig. 5.—The specimen removed by the operation described.

The line of anastomosis is reinforced with several stitches and the wound is closed with drainage of the presacral space.

Fig. 6.—Anastomosis of the anal stump and the end of the pelvic colon in two layers has been started. To the left of the diagram the internal sphincter complex is seen.

Post-operative Treatment

This is similar to that of any major abdominal procedure, the drainage-tubes being removed after three or four days.

Provided that the division of the pelvic colon is made obliquely, thus ensuring an adequate blood supply to the anti-mesenteric margin of the gut, breakdown of the anastomotic line is unlikely. Should this occur, although the perineal sinus that forms persists for some time, it is not necessary to postpone closure of the colostomy until it

FIG. 7.—Abdomen of patient following closure of the colostomy. Partial hepatectomy for secondary deposits in the liver has been carried out through a left subcostal incision.

has completely healed. As soon as rectal examination reveals that the sinus opening into the bowel lumen is adherent to surrounding structures and admits no more than the tip of the little finger, repair of the colostomy can be effected (Fig. 7). Formed stools will then by-pass the small sinus (Fig. 8) and be evacuated through the anal canal.

It has been found that for some months after the operation rectal sensation is lowered and the patient is not always conscious that the pelvic colon and the rectal stump are loaded with faeces. Glycerin suppositories are of great help in aiding regular evacuation, and with these the patient rapidly procures the habit of normal bowel action.

FIG. 8.—Healing perineal wound. A small sinus is still present at the lower end.

This operation is not advocated as a routine procedure for the treatment of carcinoma of the rectum, but it is suggested that in the type of cases described it is of value. So far as can be established by pathological investigation it is sound in its concept, and anatomically its boundaries of excision are wide. It seems to be well worthy of trial in selected cases, and especially for those to whom a colostomy would prove an intolerable burden.

REFERENCES

Babcock, W. W. (1932). *Surg. Gynec. Obstet.*, **55**, 627.
Bacon, H. E. (1945). Ibid., **81**, 113.
Balfour, D. C. (1910). *Ann. Surg.*, **51**, 239.
Black, W. A., and Waugh, J. M. (1948). *Surg. Gynec. Obstet.*, **87**, 457.
Coller, F. A., Kay, E. B., and MacIntyre, R. S. (1940). *Surgery*, **8**, 294.
Gabriel, W. B., Dukes, C. E., and Bussey, H. J. R. (1935). *Brit. J. Surg.*, **23**, 395.
Gilchrist, R. K., and David, V. C. (1938). *Ann. Surg.*, **108**, 621.
Lockhart-Mummery, J. P. (1934). *Diseases of the Rectum and Colon*. Baillière, Tindall and Cox, London.
Lynch, J. M. Quoted by Bacon (1945).
Maunsell, H. W. (1892). *Lancet*, **2**, 473.
Miles, W. E. (1936). *Post-Graduate Surgery*, vol. 1, p. 1435. Medical Publications, Ltd., London.
Pratt, J. P. (1938). *Amer. J. Obstet.*, **36**, 209.
Rankin, F. W. (1947). *Ann. Surg.*, **126**, 436.
Wangensteen, O. H. (1945). *Surg. Gynec. Obstet.*, **81**, 1.
—— (1947). *Ann. Surg.*, **126**, 437.

A NEW MECHANISM OF VITAMIN DEPRIVATION

WITH SPECIAL REFERENCE TO THE SPRUE SYNDROME

BY

A. C. FRAZER, M.D., D.Sc., M.R.C.P.

(From the Department of Pharmacology, University of Birmingham)

Vitamin deprivation may be of dietary, intestinal, or metabolic origin.

Dietary Deficiency of Vitamins.—Vitamin deprivation was originally based on the conception of dietary deficiency. The classical cases of scurvy which occurred in sailors on long sea voyages may be a true example of this type of deprivation. Beriberi and pellagra, on the other hand, can hardly be regarded as simple vitamin deficiencies (Williams, Mason, Wilder, and Smith, 1940; Meiklejohn, 1940), although some of the main features of each condition can be reproduced in animals by selective deprivation of thiamin or nicotinic acid. It is quite clear that the diets which usually induce beriberi or pellagra in human subjects are grossly deficient in many other dietary essentials. The selective dietary deficiency of one vitamin is not likely to occur under ordinary conditions of life, but such selective deficiencies may be induced by the destruction of vitamins during processing, cooking, or digestion of food. Thus, vitamin C is well known to be relatively heat-labile, and an otherwise adequate diet may be rendered deficient in this vitamin by faulty cooking methods. Again, vitamins A and E are readily destroyed by oxidation. Oxidative rancidity of fats included in the diet may destroy these vitamins, with consequent deprivation (Mattill, 1938; Whipple, 1936).

Intestinal Deficiency.—The signs and symptoms of vitamin deprivation may occur even though the diet contains an adequate supply of vitamins and in the absence of any evidence of destruction. This may be due to faulty digestion of the vitamins, or to their inclusion in unabsorbed residue. The latter may occur when large quantities of liquid paraffin are taken, resulting in absorptive deficiency of fat-soluble vitamins (Andersen, 1938). Alternatively, the mechanism of absorption of the vitamin may be defective. Thus, in obstructive jaundice, low blood prothrombin due to inadequate absorption of vitamin K may occur. Bile salts assist the absorption of this vitamin (Lord, Andrus, and Moore, 1940). The condition can be corrected by the parenteral administration of vitamin K.

Metabolic Failure.—Theoretically, faulty utilization of absorbed vitamins might occur. It is difficult to establish vitamin deficiency in such a condition, since even parenteral administration of the vitamin may give no response. Faulty utilization of vitamin A has been described in cases of alcoholic cirrhosis (Patek and Haig, 1939). Faulty phosphorylation was thought to account for certain riboflavin deficiencies (Verzar and Laszt, 1936), but the relationship of this deficiency to the adrenal cortex has not been substantiated (Nelson, 1940; Ferrebee, 1940). A second form of metabolic fault is defective synthesis. This may be observed in the case of vitamin D. The incidence of rickets was particularly high in smoky industrial towns in England and in negro children living in the northern part of the United States (Howe, 1920; Hess and Abramson, 1931). Sterol precursors of vitamin D can be synthesized in the body and vitamin activity induced by irradiation

with ultra-violet light. Absence of effective sunlight may thus be more serious than dietary deficiency of the vitamin, and vitamin deprivation in such cases may be at least partly metabolic in origin.

Vitamin Deficiencies in the Sprue Syndrome

Vitamin deficiencies have been studied and a number of relevant investigations have been made in a series of cases of defective fat absorption in Birmingham (Cooke, Elkes, Frazer, Parkes, Peeney, Sammons, and Thomas, 1946). The results of these studies may be briefly reviewed.

Relatively Transient Nature of Deprivation.—In chronic cases of the sprue syndrome the fat-absorption defect persisted more or less unchanged over long periods. From time to time, however, the patient might complain of an exacerbation of certain symptoms—especially diarrhoea, with large, bulky, fermenting stools, sometimes associated with a sore ulcerated tongue and sore eyes. The haematological changes also showed exacerbations and remissions. This group of signs and symptoms seemed to come and go—as though superimposed on a more constant underlying defect.

Nature of Deficiencies.—The commonest deficiency signs and symptoms were those affecting the tongue and eyes. The majority of cases of sprue showed signs of glossitis. From time to time the tongue became enlarged, sore, and ulcerated, scarlet-red or magenta in colour, the conjunctival vessels might be injected, and the eyes sore, with excessive lacrimation and photophobia ; cheilosis was also frequently seen. These changes were commonly associated with deprivation of riboflavin, nicotinic acid, and/or pyridoxin. Various haematological changes were also often observed. Macrocytosis was almost a constant feature of the sprue syndrome (Cooke, Frazer, Peeney, Sammons, and Thompson, 1948). These haematological changes were attributed to deficiency of folic acid and possibly other members of the vitamin-B complex. In occasional cases other vitamin deficiencies were observed.

Effects of Therapy.—In most cases of riboflavin, nicotinic acid, or pyridoxin deficiency in sprue parenteral administration of the appropriate vitamin fraction caused dramatic relief of the signs and symptoms of deprivation. Small doses were effective. In many cases very large doses of the vitamin were effective orally. It was not uncommon to find that the administration of one of the vitamin fractions by mouth might precipitate deficiency symptoms associated with some other fraction. Thus the administration of large doses of nicotinic acid might precipitate a classical ariboflavinosis. Increase of carbohydrate in the diet sometimes had a similar precipitating effect.

Relationship to Fat Absorption.—Relief of the signs and symptoms of vitamin-B deficiency was achieved in the sprue syndrome without alteration in the fat-absorption defect. Classical cases of ariboflavinosis have been observed in which fat absorption was normal. There seems no reason, therefore, to suppose that the vitamin-B deficiency is intimately related to the aetiology of the fat-absorption defect (Frazer, 1947).

Intestinal Flora.—A number of cases of the sprue syndrome have been intubated, using a technique devised by my colleagues Drs. J. M. French and M. D. Thompson, to minimize contamination. In hypochlorhydric cases thousands, and occasionally hundreds of thousands, of bacteria were observed per ml. of upper intestinal contents. In achlorhydric cases millions of viable organisms per ml. were demonstrated. The organisms were the usual inhabitants of the intestine, normally confined to the lower reaches. The type of predominating organism, the number of viable bacteria, and the level to which they reach will vary under differing environmental conditions.

Synthesis of Vitamins by Intestinal Bacteria.—Some attention has been paid to the question of bacterial synthesis of vitamins. In some cases of sprue the faeces contained more vitamins than the diet, in spite of a concomitant vitamin deficiency. Thus classical ariboflavinosis was observed in a patient passing three times more riboflavin in the faeces than was present in the diet—the amount in the diet being greater than normal requirements (Smart and Daley, 1946).

Effect of Antibacterial Agents.—Antibacterial agents may stop severe diarrhoea at least temporarily (Keele, 1949). The effect of antibacterial agents on vitamin deficiencies is unknown. An interesting observation was made using sulphasuxidine. Usually less than 10% of this drug was absorbed and the sulphathiazole level in the blood was negligible, <1-2 mg. per 100 ml. of blood. In two cases of sprue the administration of sulphasuxidine by mouth resulted in blood levels of sulphathiazole of 10.6 and 13.8 mg. per 100 ml.

Discussion

Dietary inadequacy is certainly not a common cause of vitamin deficiency in the sprue syndrome. It may account for the occasional case of vitamin-E deficiency, especially since oxidative rancidity of fats may be one of the precipitating causes in tropical sprue. It does not account for any of the common vitamin-B deficiencies. There is no evidence of any metabolic fault of vitamin-B utilization in the sprue syndrome. Parenteral administration of the appropriate vitamin fraction secures immediate relief in the vast majority of cases.

An absorptive defect due to interference from unabsorbed materials may account for the occasional vitamin-A or vitamin-D deficiency ; the latter is further complicated by changes in calcium absorption. Again, the common vitamin-B deficiencies are not due to a faulty absorptive mechanism, since large doses are often effective by mouth and the normal dietary intake is adequate in remission. There is no evidence of faulty digestion of vitamin precursors. It would seem, therefore, that the common vitamin-B deficiencies observed in the sprue syndrome do not fit into any of the known deprivation groups.

The selective nature of the vitamin-B deficiencies—nicotinic acid, riboflavin, pyridoxin, and folic acid—in sprue is very striking. The deficient vitamins are all essential growth factors for bacteria—particularly those bacteria which are known to be present in the upper part of the small intestine in sprue. Large numbers of these bacteria can be demonstrated in the upper small intestine by intubation, and their presence is also indicated by the results of sulphasuxidine administration: clearly, in the sprue syndrome the bacterial decomposition of sulphasuxidine is occurring within the absorbing area. It is well known that bacteria will first take up preformed growth factors and then synthesize more of these vitamins if necessary. In sprue the bacteria may synthesize further vitamins ; it is likely that they will take up as much preformed vitamin as possible before doing so. It is therefore suggested that in the sprue syndrome intestinal bacteria invade the upper small intestine from time to time in large numbers. This bacterial invasion may give rise to large, bulky, fermenting stools. It also results in competition between the bacteria and the host for common essential nutrients. In many cases the bacteria are the most successful competitors and the host consequently shows signs of deprivation.

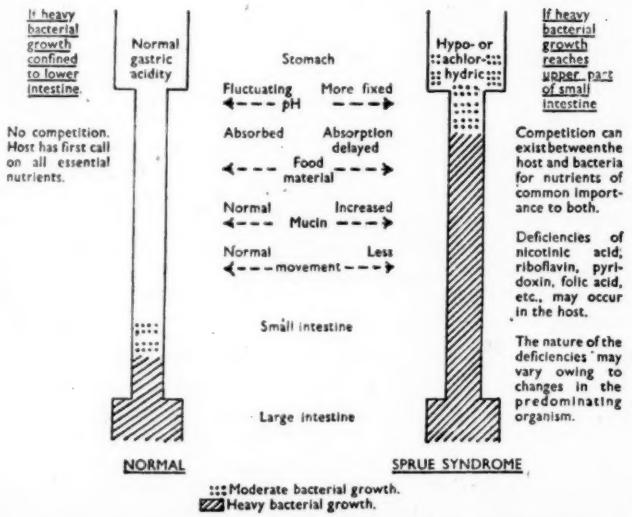
This competition hypothesis would account for the exacerbation of vitamin deficiencies and diarrhoea associated with heavy growth and high-level invasion of intestinal bacteria. This bacterial invasion may be related to fixation of *p*H as a result of achlorhydria, and possibly the presence of suitable food materials due to delayed absorption. The competition hypothesis would also account for the peculiar selective deficiencies observed in the sprue syndrome. It might also explain the administration of one vitamin precipitating the deficiency of another, since bacterial growth would be stimulated by the one and would increase the demand for the other. In oral administration of the vitamins, sufficient vitamin must be given to provide both

for the bacteria and for the host. Hence the large dosage required in oral therapy. It is also recognized that modifications of the dietary regime which are known to alter intestinal flora affect the sprue syndrome.

The part played by intestinal bacteria in vitamin synthesis in normal human subjects is obscure. It has been suggested that the modification of intestinal flora by sulphonamides or other antibacterial agents might result in faulty synthesis of vitamins and consequent vitamin deprivation. This conception of vitamin deprivation is mainly based upon experimental studies in animals and especially upon the phenomenon of refection (Kon, Kon, and Mattick, 1938). Rats and rabbits may not develop certain vitamin deficiencies when placed upon an appropriate vitamin-deficient diet. This can be shown to be at least partly due to the synthesis of B vitamins by intestinal bacteria.

The inclusion of certain types of starch in the diet and initial coprophagy are probably important factors in the establishment of refection. In some animals on a deficient diet prevention of coprophagy results in the development of vitamin deficiencies in spite of continued intestinal synthesis of the vitamins. The vitamins synthesized by intestinal bacteria can be utilized by the body only if they are released from the bacteria and absorbed from the intestinal tract. The formation of B vitamins in the large intestine in man and their continued inclusion in viable bacteria greatly limit their availablity. The conditions within the intestine in the refected rat may resemble to some extent those prevailing in the human intestine in the sprue syndrome; the possible importance of starch fermentation in both cases is of special interest. It seems clear, however, that the synthesized vitamins are much more readily available to the rat than to the human subject.

Vitamin synthesis by intestinal bacteria in the normal human subject is probably limited in extent and mainly confined to the large intestine—it is therefore unlikely to play a major part in the vitamin economy. In the sprue syndrome, synthesis may be greatly increased and the site of formation may now include normal absorbing areas. In spite of this, vitamin-B deficiencies now occur, which would suggest that the synthesized vitamins are not available for absorption, possibly owing to their retention within viable bacteria. The competition hypothesis is put forward here in its simplest possible form, but it is clear that many complexities may develop in individual cases. Some aspects of refection in rats might be usefully examined in relation to the changes in intestinal flora which can be observed in the sprue syndrome.


If heavy bacterial growth confined to lower intestine
Normal gastric acidity
Stomach
Fluctuating pH
More fixed
Absorbed
Absorption delayed
Food material
Normal
Increased
Mucin
Normal
Less
movement
Small intestine
Large intestine
No competition. Host has first call on all essential nutrients.
Hypo- or achlorhydric
If heavy bacterial growth reaches upper part of small intestine
Competition can exist between the host and bacteria for nutrients of common importance to both.
Deficiencies of nicotinic acid, riboflavin, pyridoxin, folic acid, etc., may occur in the host.
The nature of the deficiencies may vary owing to changes in the predominating organism.
NORMAL
SPRUE SYNDROME
Moderate bacterial growth.
Heavy bacterial growth.

Diagrammatic representation of competition hypothesis of vitamin deficiencies in the sprue syndrome.

This paper is especially concerned with vitamin deficiencies in the sprue syndrome. Special consideration must be given, however, to the possible importance of intestinal bacterial competition in other conditions. A similar competition situation must arise in pernicious anaemia, in which vitamin-B deficiencies are well recognized—much of the haematological picture being ascribed to them. In this condition there is, however, apparently normal fat and glucose absorption, a normal radiographic pattern, and an absence of fermentative changes. These points serve to emphasize the lack of intimate relationship between the absorptive defects in the sprue syndrome and the changes in intestinal flora and consequent vitamin deficiencies. It is possible that the absence of absorptive defects in pernicious anaemia and consequent environmental differences may result in qualitative and quantitative modifications of the intestinal flora, with resultant differences in metabolic demands. The possibility of intestinal bacterial competition along the lines indicated in this paper should be investigated not only in the sprue syndrome but in various other conditions which are thought to be closely associated, such as pernicious anaemia, pellagra, and nutritional megalocytic anaemia (Manson-Bahr, 1940, 1941). The metabolic demands of a varying but essentially non-pathogenic flora may be the key to the problem of the multiple but selective vitamin deficiencies so commonly observed in these conditions.

Original observations reported in this paper have been made as part of a team-work study on fat absorption and the sprue syndrome which is being carried out with my colleagues, W. T. Cooke, J. M. French, T. L. Hardy, A. L. Peeney, H. G. Sammons, G. Thomas, and M. D. Thompson, at the Medical School and Hospitals Centre, Birmingham. We are indebted to the Medical Research Council and the Sir Halley Stewart Trust for financial assistance.

REFERENCES

Andersen, O. (1938). *Hospitalstidende*, **81**, Suppl. p. 29.
Cooke, W. T., Elkes, J., Frazer, A. C., Parkes, A., Peeney, A. L. P., Sammons, H. G., and Thomas, G. (1946) *Quart. J. Med.*, n.s. **15**, 141.
—— Frazer, A. C., Peeney, A. L. P., Sammons, H. G., and Thompson, M. D. (1948). Ibid., n.s. **17**, 9.
Ferrebee, J. W. (1940). *J. biol. Chem.*, **136**, 719.
Frazer, A. C. (1947). *British Medical Journal*, **2**, 641.
Hess, A. F., and Abramson, H. (1931). *Dent. Cosmos*, **73**, 849.
Howe, P. R. (1920). Special Report to White House Conference, U.S.A.
Keele, K. D. (1949). Paper read at Annual Meeting of B.M.A., Harrogate.
Kon, P. M., Kon, S. K., and Mattick, A. T. R. (1938). *J. Hyg., Camb.*, **38**, 1.
Lord, J. W., Andrus, W. de W., and Moore, R. A. (1940). *Arch. Surg., Chicago*, **41**, 585.
Manson-Bahr, P. (1940). *Lancet*, **2**, 317, 356.
—— (1941). *Trans. R. Soc. trop. Med. Hyg.*, **34**, 347.
Mattill, H. A. (1938). *J. Amer. med. Ass.*, **110**, 1831.
Meiklejohn, A. P. (1940). *New Engl. J. Med.*, **223**, 265.
Nelson, D. (1940). *Amer. J. Physiol.*, **129**, 429.
Patek, A. J., and Haig, C. (1939). *J. clin. Invest.*, **18**, 609.
Smart, G. A., and Daley, R. (1946). *Lancet*, **2**, 159.
Verzar, F., and Laszt, L. (1936). *Pflüg. Arch. ges. Physiol.*, **237**, 476.
Whipple, D. (1936). *J. Pediat.*, **8**, 734.
Williams, R. D., Mason, H. L., Wilder, R. M., and Smith, B. F. (1940). *Arch. intern. Med.*, **66**, 785.

The Ministry of Health states that more blood was given for hospitals in England and Wales in the second quarter of this year than in any comparable period since the war. New donors in the quarter numbered 36,847—the biggest response since the war—bringing the total strength of donor panels to 382,382. Hospitals are now using over 40 times as much blood as before the war, and the demand is still rising. To provide for these future needs it is estimated that over 190,000 more donors are wanted.

TUBERCULOSIS OF THE BREAST

BY

RONALD W. RAVEN, O.B.E., F.R.C.S.

Surgeon to Westminster Hospital (Gordon Hospital) and to the Royal Cancer Hospital

It appears from a survey of the literature that little attention has been paid during recent years to this subject in English writings. The opportunity is taken, therefore, in presenting this case record, to review the general features of the disease and stress its importance in the differential diagnosis of lesions of the breast. It is important to appreciate the close similarity between certain forms of tuberculosis and carcinoma of the breast, and differentiation is often rendered difficult; many of the cases of primary tuberculosis reported in the literature were diagnosed incorrectly as carcinoma, and it was only after operation and pathological study of the tissues that the true situation was disclosed.

Case Report

A woman aged 43 developed a swelling in the left breast in May, 1947, following a blow through a fall one month previously. The swelling was regarded as mastitis of the upper and inner quadrant. In September the left breast became red and tense, and an abscess was incised and drained. Pathological investigation of the tissues showed chronic inflammation with no giant-cell systems or tubercle bacilli. After the operation a small sinus persisted, with slight discharge. On January 6, 1949, a small red swelling developed in the upper and outer quadrant of the left breast, and this became cystic and tender. Aspiration yielded 1.5 ml. of purulent fluid which showed tubercle bacilli on microscopy.

She had had amenorrhoea between May, 1947, and February, 1948—before this the cycle was 28 days and the duration five days—and again since April, 1948. She had never been pregnant. Her general health was good; no cough or pain in the chest. When 4 years old she had had tuberculous peritonitis, with operative treatment. In December, 1914, an operation had been performed on the left cervical lymph nodes. One brother had had tuberculous cervical lymphadenitis as a child.

On examination the patient looked healthy. Her neck showed scarring on the left side; no enlarged lymph nodes. The heart and lungs showed no gross abnormality. Scars of previous operations were seen in the right hypochondrium, but no other abdominal abnormality was found. The right breast was normal. In the lower half of the left breast there was a discharging sinus with an associated abscess; a red fluctuating tender swelling was seen in the upper and outer quadrant (see Fig.). No marked induration of the breast tissue was present. The lymph nodes in the axillae were not enlarged. *X*-ray examination of the chest revealed no abnormality.

Photograph of the affected breast, showing the tuberculous lesion in the upper and outer quadrant. There is an area of puckering in the lower and inner quadrant.

Operation. — Local mastectomy and excision of the fourth costo-chondral junction, left side. It was noted that the sinus in the lower part of the breast was connected with a caseous process in the fourth costo-chondral junction, left. The wound healed by first intention.

Study of Specimen.—In the left breast there was an abscess situated above and external to the nipple. The skin over the abscess was bluish in colour. On opening into the abscess cavity it was seen to contain yellow caseous material. In the lower and inner quadrant of the breast there was an area of puckered scar tissue. Sections through the breast beneath this scar tissue showed a sinus which could be traced through the substance of the breast to its deepest part. This sinus contained caseous material and was presumably connected with the rib which was resected. A piece of resected rib was partly replaced at the costo-chondral end by an irregular mass of granulation tissue. On histological examination both the wall of the abscess cavity and the sinus showed tubercles composed of endothelial cells surrounding areas of caseation. There was also a small round-cell infiltration. Breast tuberculosis was diagnosed.

General Features of the Disease

The condition was described in the first instance by Sir Astley Cooper, who wrote in 1829: "In young women, who have enlargement of the cervical absorbent glands, I have sometimes, though rarely, seen tumours of a scrofulous nature form in their bosoms, confined in most cases to a single tumour in one breast; but in one case, two existed in one breast, and one in the other. They are entirely unattended with pain, are distinctly circumscribed, are very smooth on their surfaces, and scarcely tender to pressure. They are very indolent, and vary with the state of the constitution, diminishing as it improves, and increasing as the general health is deteriorating." He pointed out that the condition does not degenerate into malignancy, and surgical treatment is contraindicated. His concluding remarks were: "It will be admitted by every one who deserves the title of a surgeon, that we possess no specific remedy for this disease, but that we are required to assist the digestive powers, make better blood, and convey it to the system by an increased vigour of the constitution." Since this publication over 500 cases have been reported in the literature.

The incidence has been computed at various figures: thus, Nicolson and Gillespie (1941) consider the incidence of tuberculosis compared with all breast lesions to be 0.54%; McGehee and Schmeisser (1935) give a figure of 1.87%. On this basis it is not a common condition, but it is possible that a number of cases are overlooked, the rarity being apparent rather than real.

There are two main varieties—namely, primary tuberculosis, in which there is no evidence of a tuberculous lesion elsewhere in the body, and secondary tuberculosis, in which there is evidence of a tuberculous lesion elsewhere, such as in the lungs, pleura, lymph nodes, or bone. The various lesions can be grouped under three headings as follows:

Nodular Lesion.—A circumscribed lump of variable size forms in the breast, slow caseation occurs with softening of the tissues, and eventually an abscess forms which may produce a sinus in the overlying skin.

Sclerosing Lesion.—A circumscribed lump develops which is hard in consistency owing to excessive fibrous-tissue formation. This variety is seen in older patients.

Atypical Lesions.—A tuberculous ulcer develops in the skin near the nipple and nodules are formed in the breast tissue later; a subcutaneous lesion develops which resembles a furuncle; or vesiculated pimples form with indurated bases.

Mode of Entry of Tubercle Bacillus

Considerable discussion has been aroused regarding the possible routes of entry. The organisms may gain an entrance through the ducts of the nipple or through an abrasion in the skin, but these must be remote possibilities, although several cases have been reported. Thus, Morgen (1931) quotes Ingier, who described a case in which the inflammatory process was confined to the walls of the excretory ducts and the periacinous tissue, the interacinous tissue

being only slightly involved. Morgen also quotes Ely, who mentions a woman who covered her breast with a piece of linen contaminated with tuberculous sputum and soon after developed tuberculosis in this breast.

Haematogenous infection may occur, although Nagashima (1925) investigated 34 patients who died of miliary tuberculosis, studying the breast tissue microscopically, by smears, and guinea-pig inoculations, but was unable to demonstrate any involvement. The case recorded above is instructive in that multiple tuberculous lesions developed at long intervals in widely separated parts of the body, and it is assumed the tubercle bacilli were transported by the blood stream.

Many authors have stressed the importance of infection by the lymphatic system; the primary lesion being cervical, axillary, or mediastinal tuberculous adenitis, and the breast being affected by retrograde infection. Morgen quotes Halsted and Le Court, who state that there is tuberculous axillary adenitis on the same side as the affected breast in 75% of cases, and Berchtold, who found the primary disease in the axillary lymph nodes and the secondary in the breast in 8 out of 37 cases reported. He also calls attention to a case described by Johannet in which at necropsy subpleural tuberculosis was demonstrated, extending to the axillary lymph nodes and eventually to the breast.

Finally, the breast may be involved from underlying tuberculosis of the sternum, costo-chondral junction, or rib. In this case the lower of the two lesions extended directly down to a diseased costo-chondral junction.

Symptomatology and Differential Diagnosis

The disease occurs between the ages of 20 and 50, when the breasts are most active. The majority of patients are apparently in good health; some may give a past history of tuberculosis, as did my patient, who had had tuberculous peritonitis and cervical adenitis. The most frequent presenting symptom is a lump in the breast, which is often painless and discrete.

When caseation is present the border of the lump is well defined. The overlying skin shows certain changes; thus there is often fixation and dimpling with retraction of the nipple, or it is stretched and red, sinus formation developing later. Retraction of the nipple may be the first sign of the disease. An abscess is present sometimes, and Morgen states that a fistula is seen in 50% of cases. Tubercle bacilli may be demonstrated in the discharge. Other lesions may be present in the breast, including fibro-adenoma or carcinoma.

Enlargement of the axillary lymph nodes is often present, and this may precede the development of the disease in the breast. A radiological examination of the chest should be made in every case; Grausman and Goldman (1945) state that pulmonary tuberculosis is present in 12 to 16% of cases. The disease is usually unilateral, but cases with both breasts involved have been reported.

The following diseases must be considered in the differential diagnosis.

Carcinoma.—Many of the reported cases of tuberculosis of the breast were misdiagnosed as carcinoma, and differentiation may be difficult, especially in the sclerosing types. The degree of hardness is greater in carcinoma and the axillary lymph nodes may also be hard. The deformity of the nipple may be greater in carcinoma. Tuberculosis tends to occur in younger age groups than carcinoma, and there may be a purulent discharge from the nipple. When a sinus is present it may be possible to isolate the tubercle bacillus; in all doubtful cases a biopsy and histological examination must be performed.

Benign Fibro-epithelial Tumours.—Differentiation is not difficult usually in these cases. The tumours are circumscribed and encapsulated and mobile in the breast tissue. There is no involvement of the overlying skin nor any change in the nipple. The axillary lymph nodes are not enlarged.

Cystic Hyperplasia.—In this condition both breasts are often involved and the swellings produced are larger. The cysts are palpable, causing an uneven surface in the swelling. There are no changes in the overlying skin. The axillary lymph nodes are not enlarged.

Acute Mastitis.—Differentiation is not difficult in this instance. There are fever and other general symptoms of an acute infection, and locally the cellulitis, with or without abscess formation, is typical of the condition.

Actinomycosis.—When a discharging sinus is present, together with an indurated swelling in the breast, actinomycosis must be considered, although this is an uncommon lesion. The typical sulphur granules may be present in the discharge and the fungus isolated.

Gumma.—This is an uncommon lesion in the breast; degeneration may occur with sinus formation in the skin. A Wassermann test and biopsy will help in the diagnosis.

Traumatic Fat Necrosis.—There may be a history of an injury to the breast, causing a localized hard swelling without any inflammatory signs. Biopsy and microscopical examination may be required to determine the diagnosis.

Association of Tuberculosis with Carcinoma of Breast

The presence of tuberculosis and carcinoma in the same breast has been noted on a number of occasions. Thus, Grausman and Goldman (1945) collected 26 cases from the literature and added two cases of their own. It is obviously important to remember this possibility, as an associated carcinoma may be overlooked, with serious consequences for the patient. Morgen discussed the interpretation of the relationship of these conditions. The two conditions may occur independently, either simultaneously or consecutively. The tuberculosis may be engrafted on the malignant condition as a result of the greater susceptibility of breaking-down tissue to infection. It is possible that the carcinoma is the result of the chronic irritation of the tuberculous inflammatory process.

In a number of these cases it was thought that the carcinoma was of longer duration in the breast and of a fibrous type; the tuberculous lesions showed no calcification, so it is possible that tuberculous infection occurred in tissues of decreased resistance or increased susceptibility. In some cases of carcinoma of the breast it was found at operation that there was tuberculous adenitis in the axillary lymph nodes. The breast is not the only site where these conditions coexist, for carcinoma has been found in chronic tuberculous cavities in the lungs.

Treatment

The maintenance of the patient's general health is important, as in all cases of tuberculosis. When the disease is localized to the breast and there is no evidence of involvement of the axillary lymph nodes, local mastectomy should be performed. If there is enlargement of the axillary lymph nodes mastectomy is combined with excision of these lymph nodes, and a careful dissection of the axilla is necessary. In order to carry this out the tendons of the pectoralis major and pectoralis minor muscles should be divided to open up the axilla; at the end of the dissection the tendon of the former muscle is sutured. If the underlying costo-chondral junction or rib is involved, this must be excised. When tuberculosis and carcinoma coexist a radical mastectomy is performed with or without high-voltage *x*-irradiation, according to the type of carcinoma which is present. Now that streptomycin is available in greater quantities its action in cases of tuberculous mastitis may be beneficial,

and before resorting to surgery in the future the effects of this drug should be tried.

Summary

A case record is presented of tuberculosis of the breast and underlying costo-chondral junction. The patient gave a history of old tuberculous peritonitis and tuberculous cervical adenitis. Tubercle bacilli were isolated from the discharging sinus. The general features of the disease, the symptomatology, and the differential diagnosis are described, and special emphasis is laid on the importance of differentiating carcinoma. Attention is called to the association of tuberculosis and carcinoma in the same breast. The treatment is described for various types of case.

I wish to thank Dr. J. H. O. Earle for studying the pathology of the specimen, and Dr. Peter Hansell for the photograph.

REFERENCES

Cooper, Sir Astley (1829). *Illustration of Disease of the Breast.* London.
Grausman, R. I., and Goldman, M. L. (1945). *Amer. J. Surg.*, **67**, 48.
McGehee, J. L., and Schmeisser, H. C. (1935). Ibid., **28**, 461.
Morgen, M. (1931). *Surg. Gynec. Obstet.*, **53**, 593.
Nagashima, Y. (1925). *Arch. Path. Anat.*, **254**, 184.
Nicolson, W. P., and Gillespie, C. E. (1941). *Sth. Surg.*, **10**, 825.

SOLITARY CEREBRAL METASTASES FROM BRONCHIAL CARCINOMATA

THEIR INCIDENCE AND A CASE OF SUCCESSFUL REMOVAL

BY

GEOFFREY FLAVELL, F.R.C.S., M.R.C.P.

(*From the Department of Thoracic Surgery, London Hospital*)

The extirpation of metastases is not generally regarded as a rewarding surgical practice, and although many an abdominal surgeon must have been tempted to resect an apparently single deposit in the liver, and many a thoracic one must at some time or other have mistaken a secondary tumour in the lung for a primary lesion, few records of their experiences exist, and fewer still of the planned removal of both primary and secondary growths.

One is apt to assume that the appearance of a metastasis inevitably implies the existence of others and the certainty of death, and examples in the literature to support a contrary hope are rare. In 1946 Alexander and Haight were, however, able to collect the histories of 24 patients who had undergone pulmonary resections for solitary metastases in the lung after previous excisions of the primary growths, 15 of which were carcinomata and eight sarcomata. Of the 24, one died, 11 had recurrences, but 12 remained free ; and among the latter eight survived their resections by more than a year. One patient (who lived 12 years) had originally been operated upon by Barney (1944a, 1944b) for a renal adenocarcinoma, the lung metastasis having been seen a year before his nephrectomy and removed a year later, so that its malignancy must have been low. Six other of the primary lesions were also renal-cell carcinomata, and it is of interest that both Bumpus (1928) and Beer (1937) have reported spontaneous regression of such metastases.

Albright in 1944, Friedman in 1943, and Turner and German in 1941 have described in all four instances of successful extirpation of characteristically slow-growing skull metastases from thyroid carcinomata ; and Cattell (1940) reports a patient well one year after the removal of a solitary secondary in the liver at the abdominal stage of an abdomino-perineal resection of a rectal carcinoma. He argues, "The patient is better off with a large focus of malignancy removed, and there is at least some clinical evidence that there may be retardation of the malignant process."

The only successful removal on record (apart from the one reported below) of both primary and cerebral secondary growths was carried out by Thurel in 1942, when he excised a deposit from the right frontal lobe of a patient who had had a Halsted operation for carcinoma of the breast exactly a year previously. She remained symptomless two years later (Alajouanine, Thurel, and Longuet, 1944).

The incidence of cerebral metastasis in carcinoma of the lung was estimated by Ochsner and de Bakey, reviewing 3,047 patients, to be 16.5%. Other authorities put the figure even higher—Graham and Wagner at 24% and Olsen at 36%. In 448 proved pulmonary cancers Tinney and Moersch (1944) found that 19 (4%) presented with central nervous symptoms, and in these people the average duration of life from the onset of their symptoms was six months.

In the necropsy records of the London Hospital from 1909 to 1949 I have been able to find 85 examples of cerebral metastases accompanying a primary bronchial carcinoma. Of these, 26 were single in the brain or cerebellum—a percentage of 31 in a group of whom many died in the extremity of their disease, with numerous secondary deposits elsewhere in their bodies. Furthermore, eight (9.4%) were completely solitary in the body (if removable hilar glands alone be ignored) ; the cerebral lesion was a lonely satellite of the pulmonary primary growth—one, indeed, occurred two years after a successful pneumonectomy.

Case Report

In June, 1947, a man aged 34, in a responsible clerical position, was found on mass radiography to have a circumscribed shadow at the hilum of his left lung. He had had no symptoms of any sort, but one day in October he developed a headache, accompanied by noises and followed an hour later by an epileptiform fit in which he lost consciousness for 10 minutes and was incontinent of urine. This was not repeated, but frontal and vertical headaches persisted and were later associated with occasional diplopia, flashes of light, and other visual disturbances. He was admitted to the London Hospital on November 22, 1947, and except for early papilloedema, very slight left lower facial weakness, and equally slight bilateral hypotonia (a little more pronounced upon the left side), he had no abnormal physical signs either of his chest or of his nervous system. Lumbar puncture revealed a pressure of 210 mm., and the protein content of the cerebrospinal fluid was raised to 120 mg. per 100 ml. Although bronchoscopy was negative, there seemed to be little doubt that a primary carcinoma of the left lung was accompanied by a cerebral metastasis. Since the necropsy findings on similar patients, as already mentioned, gave some encouragement, a deliberate plan was then made to attack the secondary deposit, and, if it proved operable and was single, subsequently to remove the lung with its primary growth.

Because the symptoms and signs of raised intracranial pressure became severe, a palliative right subtemporal decompression was performed on December 18. This proved effective, and on January 8, 1948, ventriculography showed displacement of the system to the left, with no filling of the right ventricle, indicating a large right-sided lesion. Consequently a right fronto-lateral exploratory craniotomy was carried out by Mr. D. W. C. Northfield ; this revealed a highly vascular lobulated mass about 7 by 4 cm., occupying a superficial position in the right temporal lobe, but not transgressing the Sylvian fissure. It was secondarily adherent to the dura mater over some 2 cm.[2] The whole tumour, with a narrow margin of apparently healthy brain tissue, was removed with the overlying adherent dura. Histological section proved it to be a secondary carcinoma, but gave little indication of its origin.

The patient made a good recovery, and eight weeks later was readmitted, this time to the thoracic surgery department.

Radiographs showed that the chest opacity had very considerably increased in the past three months, but bronchoscopy remained negative. On March 11 a left pneumonectomy was carried out by Mr. Vernon Thompson. The growth, which was in the hilar region, was massive, but no enlarged mediastinal glands were found, and there was no growth in several hilar glands later sectioned. The tumour was a squamous-celled carcinoma. Convalescence was again uneventful, but in view of the dural adhesions the patient was referred to Dr. Frank Ellis for deep *x*-irradiation of the region of the cranial defect. No radiation was given to the chest.

At the time of writing, 18 months after the removal of his lung, the patient is well, works a full day in his exacting employment, and has no sign of recurrence or of any further metastasis.

I am indebted to Mr. D. W. C. Northfield and to Mr. Vernon Thompson for permission to publish this case history; and to Professor Dorothy Russell and Dr. W. W. Woods for their kind assistance.

References

Alajouanine, Th., Thurel, R., and Longuet, Y.-J. (1944). *Rev. Neurol.*, **76**, 267.
Albright, Hollis L. (1944). *New Engl. J. Med.*, **230**, 573.
Alexander, J., and Haight, Cameron (1946). *Univ. Hosp. Bull., Ann Arbor*, **12**, 117.
Barney, J. J. Dellinger (1944a). *J. Urol.*, **52**, 406.
—— (1944b). *Trans. Amer. Ass. gen.-urin. Surg.*, **37**, 189.
Beer, E. (1937). *Surg. Gynec. Obstet.*, **65**, 433.
Bumpus, H. C. (1928). *J. Urol.*, **20**, 185.
Cattell, R. B. (1940). *Lahey Clin. Bull.*, **2**, 7.
Friedman, H. H. (1943). *Arch. Surg.*, **46**, 377.
Tinney, W. S., and Moersch, H. J. (1944). *Arch. Otolaryng.*, **39**, 243.
Turner, O., and German, W. J. (1941). *Surgery*, **9**, 403.

HUMAN INFESTATION WITH TRICHOSTRONGYLUS IN SOUTH PERSIA

BY

IAN S. STEWART, M.B., Ch.B.

Pathologist, Anglo-Iranian Oil Co., Ltd.

An investigation of the worm infestation of the labourers employed by the Anglo-Iranian Oil Company at their refinery at Abadan was undertaken in January, 1947. These men numbered 30,000, and from the routine investigations made in the company's pathological laboratories it was believed that about one-quarter of them harboured hookworm and about one-sixth of them *Ascaris*. *Trichuris*, *Enterobius*, and *Hymenolepis* were known to be much less frequent.

Abadan Island is mainly arid desert, except for a belt of date palms at its margin and in the residential areas close to the refinery, where abundant irrigation by pumped river water is available. For most of the year the climate is extremely hot and dry, the rainfall occurring only in the cool winter months. The refinery area is furnished with metalled roads, and the labourers wear shoes except when in their own homes. The conditions therefore are the very reverse of those in which ankylostomiasis would be frequent.

"Ground itch" around the ankles is not seen, grave anaemia is infrequent, and attempts to dislodge the worms by means of such drugs as carbon tetrachloride and tetrachlorethylene had been consistently unsuccessful. One notable case was that of a British medical officer who had passed ova for five years in spite of the use of all known treatments and who had remained in excellent health except when enduring the discomforts of purgation.

Present Investigation

Technique of Laboratory Investigation.—(1) A fragment of freshly passed faeces was emulsified in saline on a slide, and a cover-slip applied. (2) A considerable quantity of faeces was intimately mixed with saturated sodium chloride solution in a test-tube, filled to the brim, and a slide placed in contact with the upper surface of the fluid. After 30 minutes the slide was removed and a cover-slip placed on the adherent fluid.

Altogether 1,000 specimens were examined. During the examination it became evident that two distinct eggs were being diagnosed as those of hookworm. In the accompanying Table these are quoted together as "hookworm."

Parasite	In Direct Film	In Flotation	In Direct Film Only	Total Reported
"Hookworm"	278	675	20	695
Ascaris lumbricoides ..	162	211	55	266
Trichuris trichiura ..	25	74	13	87
Hymenolepis nana	8	17	3	20
Double infestation ..	—	—	—	229
Treble infestation	—	—	—	21
No infestation	—	—	—	173

Enterobius vermicularis was not seen in this series, and is distinctly rare. The ova were reported only [illegible] times in 19,000 routine specimens in the year 1948, but no special methods such as anal scraping were employed. Similarly *Taenia saginata* was not encountered, but it is fairly frequent, ova or segments having been found 144 times in the same series of 19,000. *Taenia solium* is unknown, but is not to be expected among a people whose religion forbids the eating of pork.

The differences noted between these two "hookworm" ova before the identity of both was established were as follows: One was the characteristic *Ancylostoma* egg with rounded ends, one, two, or four blastomeres, and an opalescent appearance. The other was somewhat larger, always showed advanced segmentation, and had one end rounded and the other slightly pointed. It lacked the opalescent appearance of true hookworm and was much more clearly visible under the low-power objective of the microscope.

Once the distinction was established, the number of each appearing in the second 500 specimens was recorded and found to be 16 of the true hookworm and 324 of the false. This agrees fairly well with the figures recorded for the year 1948, when all the technicians were familiar with the two types: 67 cases of true hookworm were reported and 1,671 of its imitator.

Craig and Faust (1945) describe *Trichostrongylus* as a very frequent parasite of sheep and goats. Thirty samples of faeces were therefore collected from sheep intestines obtained from the local slaughterhouse and ova identical with those found in human faeces were observed in all of them. In addition adult worms were discovered in five of the sheep.

The adult worms have not been found in man. The population is overwhelmingly Moslem and the strongest objection is made to necropsies. Consequently only an occasional medico-legal necropsy is done, and, although a search is made for *Trichostrongylus* on each occasion, this has so far yielded no results and the species remains unidentified. Five patients were admitted to hospital and treated with a succession of anthelmintic drugs, but no worms were found in the stools and the men all continued to pass ova. This is in accordance with Maplestone's (1941) statement that no effective means of eradicating the worms is known.

Although final and complete proof that this second parasite was *Trichostrongylus* had not been obtained, as the adult worms had not been isolated, the parasite was assumed to be of this genus for the following reasons: (1) The climate is not one in which the life cycle of *Ancylostoma* could favourably be completed; (2) the wearing of shoes

and boots renders invasion of the skin by *Ancylostoma* larvae improbable ; (3) " ground itch," associated with skin invasion by *Ancylostoma* larvae, is not seen ; (4) mass infestation by *Ancylostoma* yields a considerable proportion of cases of grave anaemia ; (5) anthelmintic drugs have been found to be almost useless in eradicating the worms ; (6) the ova agree in every detail with the published description of *Trichostrongylus* ; and (7) ova identical with those found in man were observed in a series of sheep examined.

Details of these findings and conclusions were therefore circulated among the company's medical officers, recommending that anthelmintic treatment should not be employed for the presumed *Trichostrongylus* infestations but only for the other helminths reported.

Symptomatology of Trichostrongylus Infestation

Maplestone (1941) considers that no significant symptoms occur in man. Faust (1939) considers that a heavy infestation may produce a severe secondary anaemia, but in the series encountered here the ova have always been scanty. In Abadan, in 1946, of 150 labourers who had been diagnosed as suffering from " hookworm disease " only six cases had a haemoglobin of less than 10 g. % and only one of these had a reading of less than 7 g. %. It seems probable that these six men were the genuine cases of ankylostomiasis in the series.

Forty healthy and symptomless school-children aged between 10 and 12 years were sent for investigation by the schools medical officer. Thirty-one were passing *Trichostrongylus* ova, and this provides additional evidence of the trivial nature of the infestation.

Mode of Transmission.—Man contracts the infestation by swallowing the larvae, and Watson (1946) quotes a number of isolated cases in Europe and the United States which were traced to sheep or goats. Although these animals are numerous on Abadan Island, few of the labourers are in close contact with them. Presumably the parasite is now being passed from man to man.

Diagnosis.—Watson in his paper deals at length with the points differentiating *Ancylostoma* ova from *Trichostrongylus*. He states that segmentation in tropical heat is so rapid that any delay in examination renders this distinction useless. The 1,000 cases examined in Abadan all passed stools on paper in the latrines adjoining the laboratory and handed the specimen to a technician immediately. Consequently the degree of segmentation has been of considerable diagnostic value.

Summary

An investigation of the relative frequency of human infestation with *trichostrongylus* in South Persia is described : 70% of the inhabitants carry the harmless sheep parasite *Trichostrongylus* and 25% the common *Ascaris*. Other helminthic parasites are rare.

A long-standing confusion of *Trichostrongylus* ova with *Ancylostoma* ova had occurred, with the provision of much ineffective treatment and waste of time. Part of a large labour force had been consuming unsuitable drugs intermittently, in some cases for a considerable period, and had thus been impeding the work of a very busy out-patient department.

I am indebted to Mr. A. C. Turner, Chief Medical Officer in Iran and Iraq, of the Anglo-Iranian Oil Company, for permission to publish this investigation, and to Professor J. J. C. Buckley, of the University of London, for criticism and advice.

REFERENCES

Craig, C. F., and Faust, E. C. (1945). *Clinical Parasitology*, 4th ed. Kimpton, London.

Faust, E. C. (1939). *Human Helminthology*, 2nd ed. Lea and Febiger, Philadelphia.

Maplestone, P. A. (1941). *Indian med. Gaz.*, **76**, 710.

Watson, J. M. (1946). *J. trop. Med. Hyg.*, **49**, 94.

A CASE OF PULMONARY STRONGYLOIDIASIS

BY

FINTAN L. CORRIGAN, L.R.C.P.I.

Acting Medical Superintendent, West Regional Sanatorium, Castlerea

The following case presents two interesting features of *Strongyloides stercoralis* infestation with pulmonary manifestations. It is interesting as a case treated for 12 months for pulmonary tuberculosis.

Case Report

An Army sergeant aged 51, with 32 years' service in India, Gibraltar, Hong Kong, Singapore, Shanghai, Egypt, and Palestine, was admitted to the Military Unit, Harefield County Hospital, in March, 1947. He had had an acute illness in April, 1946, with pain in the right side of the chest, and was admitted to hospital, where he was found to have a right-sided pleural effusion. He was given 30 g. of sulphathiazole, an underlying lobar pneumonia being presumed, but the pyrexia continued. Aspiration of the chest produced 1 pint (570 ml.) of greenish fluid, which contained 8,730 white cells per c.mm. These were predominantly lymphocytes and the fluid was sterile. No tubercle bacilli grew on culture. He was treated by repeated aspirations and air replacement of the effusion, the fluid becoming haemorrhagic and later pocketing at various levels. In May, 1946, he was found to have an opacity in the left midzone and a slight tender enlargement of the liver. After that he had further aspiration of fluid and prolonged rest in bed. The condition gradually improved. Sputum tests were persistently negative for tubercle bacilli, as was repeated fluid culture. In July he was transferred to another hospital ; so before admission to Harefield he had spent periods in three hospitals, amounting to nine months.

On admission his general condition was good. He was afebrile. He had a slight cough, with a small quantity of frothy sputum but no pain (previously he had stabbing pain in the right side of his chest). There were no night sweats and no haemoptysis. Occasional attacks of asthma were relieved by ephedrine. He was gaining weight (he had lost 3 st. (19 kg.) during his illness). There was no diarrhoea and no history of pruritus or anal bleeding.

On examination pronounced wasting of the right side of the chest was seen with diminished movement and dullness over the right base and impairment of breath sounds in this area. Harsh rhonchi were heard over both lungs. There was nothing else of note apart from bilateral Dupuytren's contractures. A blood count showed : haemoglobin, 110% ; red cells, 5,950,000 ; white cells, 9,800 (polymorphs 43%, eosinophils 30%, lymphocytes 21%, monocytes 6%). The B.S.R. was 10 mm. in one hour (Westergren).

On culture the sputum was repeatedly negative for tubercle bacilli.

A radiograph showed the heart and trachea to be displaced to the right. The appearance of the right lung suggested pleural effusion or residual pleural thickening, together with infiltration of the apex. The left lung seemed to be clear, the previous lesion having apparently resolved.

In view of the eosinophilia (30%) a specimen of stools was sent to the laboratory, which reported numerous *Strongyloides stercoralis* larvae in the specimen.

The patient continued to have frequent attacks of asthma, often twice daily, which were relieved by ½ gr. (32 mg.) of ephedrine hydrochloride.

Attempts were made to clear the infestation by using gentian violet capsules (1½-hour coating) 1 g. three times daily half an hour before meals until 50 g. were given. In view of the pulmonary symptoms, intravenous gentian violet (15 ml. of a 0.5% solution) was injected on alternate days for a month. Both these courses were carried out simultaneously. They

were without effect on the clinical condition, and the larvae persisted in the stools. A second attempt was made with hexylresorcinol. The patient, who had been given a saline purgative the previous day, received 9 g. of the drug at 6 a.m. No food was given for five hours, and a saline purgative was administered 24 hours after the dose. Following this treatment the majority of larvae in the stools were dead and there was considerable difficulty in finding any living ones. During this period, which lasted ten days, the patient was free from attacks of asthma. A specimen of stools ten days after the dose had been given contained numerous living larvae and the asthmatic attacks returned at the same time.

On July 30 he was transferred to another hospital under the care of a specialist in tropical diseases, who again greatly reduced the number of larvae in the stools, this time with gentian violet treatment. There was a simultaneous improvement in his asthma during the period of reduction. It was considered that the asthma was definitely related to the *Strongyloides* infestation. During all this period the sputum was persistently negative for tubercle bacilli on concentration and culture, and *Strongyloides* larvae were not found in the sputum. The *x*-ray appearances had not changed since his admission to Harefield.

Discussion

Pulmonary changes associated with *Strongyloides stercoralis* infestation have been described by Lowe and Lancaster (1944) in their report on 16 cases of strongyloidiasis. Seven of their cases had pulmonary symptoms, four complained of unproductive cough for some weeks, one had been investigated for suspected pulmonary tuberculosis, and one had a small haemoptysis whilst under observation in hospital. Radiographic examination of four patients revealed increased bronchovascular markings. On no occasion had larvae been found in their sputum.

Gage (1911) reported a case in which there were signs of diffuse bronchitis and lobar pneumonia with *Strongyloides* larvae in the sputum. At post-mortem examination the diagnosis of *Strongyloides* pneumonitis was confirmed. Froes (1930) reported a case of pleural effusion in which rhabditiform larvae were discovered before death. Berk *et al.* (1943) describe two cases of strongyloidiasis with pulmonary symptoms. In both cases tuberculosis was suspected owing to cough and sputum, in one case blood-stained, and increased roentgenological markings. Both cases had pronounced eosinophilia. In neither case were larvae recovered from the sputum. In natives with *Strongyloides* infestation for long periods, De Langen and Lichenstein have reported severe asthmatic attacks.

In the case described above, pulmonary symptoms were produced by the infestation. The relationship of the asthma to those periods when living larvae were present in the stools in large numbers is worthy of note. In spite of improvement in the symptoms while under treatment with both hexylresorcinol and gentian violet there was failure to eradicate the infestation entirely.

The significance of the pleural effusion in April, 1946, is difficult to assess. There is no report of larvae in the fluid aspirated at that time, and in the cases of pleural effusion secondary to *Strongyloides* infestation previously reported larvae have been found in the effusion fluid.

I wish to express my thanks to Dr. K. R. Stokes, Medical Director, Harefield County Hospital, for permission to publish this paper; to Dr. John C. Roberts, physician to the Military Unit, Harefield, for advice and criticism and for his invaluable help at all times; and to Dr. F. E. T. Scott, who carried out the bacteriological investigations.

References

Berk, J. E., *et al.* (1943). *Gastroenterology*, **1**, 1100.
Froes, H. P. (1930). *Ann. Parasit. hum. comp.*, **8**, 171.
Gage, J. G. (1911). *Arch. intern. Med.*, **7**, 561.
Lowe, T. E., and Lancaster, H. O. (1944). *Med. J. Aust.*, **1**, 429.

A TIDAL-AIR WHISTLE

BY

F. C. EVE, M.D., F.R.C.P.

The main object of artificial respiration is to produce an adequate tidal air. This whistle, held in the subject's lips, makes his tidal air audible to the operator, the instructor, and the class.

Up till now the ritual of resuscitation has been performed with faith and hope but without evidence that its object was being achieved. Part of expiration might be heard; inspiration was never audible. An instructive instance occurred recently at a meeting held in Beverley before a doctor delegated by the Swiss Red Cross. When the operator, a man with ten years' experience, carried out Schäfer's method the whistle hardly sounded; but when he was replaced by a highly skilled operator it sounded for all to hear. Examiners armed with a whistle could find and remedy many defects.

The whistle is on the bird-call principle, because it must sound during inspiration as well as in expiration—an obvious need for the skylark. It can be boiled, and is easily washed (e.g., in "dettol") each time the subject is changed. It works when its interior is still wet. Counting in seconds—often incorrectly estimated—can now be discarded: timing is done by the whistle to suit the subject's physique. When the inspiratory sound ceases (not before) expiration is induced, and vice versa. If the whistle is obeyed, respirations will not be hurried or jerky. The classes become interesting, and are even amusing. Usually the timing coincides approximately with the orthodox 12 per minute of Schäfer and Silvester. In the rocking method, as it produces a greater tidal air, the longer, smoother whistles call out for a slower rate of about 9 per minute. This is also better for the circulation (4 seconds head-down; 3 seconds feet-down). Tests on larger numbers are needed.

The model has been found to work on all healthy adults and on children of 4–5 stone (25.5–32 kg.), rocked manually. The largest subject was a six-foot (1.8 m.) doctor with a 44-inch (1.12 m.) chest who was rocked for over five minutes, whistling loud and long. He said he was so comfortable that he nearly went to sleep. Yet, when doing his own breathing at rest, the 5-mm. aperture was only just adequate.

Dr. A. A. Harper, of the Physiology Laboratory of Manchester, kindly measured carefully the effect of the whistle in Schäfer's method in two subjects. He found it did not affect the volume of the air breathed, but of course it increased the resistance slightly. The figures were: inspiratory pressure increased from 3.6 to 7.2 cm. H_2O; expiratory increased from 2 to 4.1 cm. H_2O. He considers that these resistances would be of no importance in training conscious subjects. He also allows me to adopt the very convenient nose-clip he used.

Professor E. A. Pask, of the Newcastle Department of Anaesthesia, was good enough to measure the sensitivity of the whistle. With a respiration pump it was just audible at a tidal volume of 200 c.cm. at 8 respirations a minute with a rate of flow of 3.6 litres a minute; or, with a steady flow of oxygen, at 4 litres a minute. He considers it "an instrument of remarkable sensitivity which will be of considerable use in training." In Dr. Harper's subjects the volumes per minute ranged from 6.6 to 7.8 litres with the whistle in Schäfer's method. I am told that the inspiratory note is upper B flat, and expiration usually an octave lower.

The whistle is held in the teeth and closed lips, so that it cannot be applied in cases of unconscious asphyxia. No time-consuming gadgets can yet be authorized where every second is vital. The device is intended to train operators to do their life-saving task efficiently.

At a recent demonstration in London before 130 doctors of the St. John Ambulance Brigade nearly all signified, by a show of hands, their wish to try the method. The tidal-air whistle and nose-clip can now be obtained from Messrs. Siebe Gorman and Sons, Tolworth, Surrey, for a few shillings.

Medical Memoranda

A Case of Twins

The publicity which nowadays is focused on the higher categories of multiple births has caused mere twins almost to escape attention. The following case, however, is interesting enough to be placed on record.

CASE REPORT

The patient was a multigravida aged 26, height 5 ft. 3 in. (1.6 metres), weight 8 st. 5 lb. (53 kg.). Her last menstrual period began on May 1, 1947, and her expected date of delivery was on February 8, 1948. She had one child, a normal full-time delivery on November 10, 1942, weighing 8 lb. 15 oz. (4.05 kg.). There was a history of twins in the family.

In the early months of pregnancy she had some nausea and sickness, which soon improved. At 19 weeks the fundus was two fingerbreadths above the umbilicus. At 23 weeks it reached to midway between the umbilicus and xiphisternum. At 30 weeks the uterus measured 37 in. (0.94 metre) in circumference and 14 in. (35 cm.) in convexity. One small head was felt in the pelvis. *X*-ray examination on November 21 showed twin pregnancy, the first a vertex and the second a breech.

The patient continued to feel well for the rest of the pregnancy, apart from increasing heaviness. Her weight rose from 8 st. 5 lb. to 11 st. 10 lb. (53 to 74.4 kg.). Her highest blood pressure was 136/80, and at no time was there any albuminuria or oedema. She was given iron and calcium during pregnancy, and was admitted for rest one week before term.

On admission both foetuses presented by the vertex. The foetal heart rates were 136 and 142. Measurements of the uterus were : circumference 46 in. (1.16 metres) and convexity 23 in. (58 cm.).

A medical induction was contemplated at term, but at 10.30 p.m. on February 8, 1948, she went into labour. At 5.30 a.m. the next day the os was fully dilated, and at 7.30 a.m. she was delivered spontaneously of a living male infant, weighing 10 lb. 0½ oz. (4.54 kg.) in the R.O.A. position. After 20 minutes pains restarted, and 15 minutes later a second living male infant, weighing 8 lb. 3 oz. (3.71 kg.) was born in the L.O.A. position. Twenty-five minutes later the placenta and membranes were expelled intact, the total length of labour being 10 hours 25 minutes. There was a loss of 18 oz. (510 ml.). The placenta was binovular in type and weighed 3 lb. 15½ oz. (1.8 kg.)—i.e., little less than one-quarter of the combined weights of the infants.

The puerperium was entirely uneventful. Both infants had regained their birth weight by the seventh day, and by the tenth day the larger one took 18 oz. of milk from the breast, and the smaller one 14¾ oz. (420 ml.). Neither took less than this in 24 hours during their subsequent days in hospital. Residual milk expressed was 3¼ oz. (106 ml.), making a total yield of 36 oz. (1.02 litres) of breast milk on the tenth day.

The babies were fed simultaneously at all feeds, and were discharged on the 19th day, fully breast-fed, and weighing 10 lb. 1½ oz. and 8 lb. 9 oz. (4.58 and 3.88 kg.) respectively. The mother had the antenatal preparation of the breasts which is practised at this hospital (Waller, 1946), and during her lying-in needed no more help than the usual care and patience of the nursing staff.

Throughout her pregnancy she was well, and she carried the babies to term, a comparatively uncommon event in twin pregnancies. The records of this hospital show only 14 instances out of 67 twin deliveries in the past four years.

Hospital	Year	No.	Average Weight				Heaviest Weight			
			Twin 1		Twin 2		Twin 1		Twin 2	
			lb. oz.	kg.	lb. oz.	kg.	lb. oz.	kg.	lb. oz.	kg.
Queen Charlotte's ..	1945	19	5 6	2·44	5 9	2·52	7 9	3·43	8 8	3·85
Guy's ..	1946	17	5 1	2·29	6 1	2·75	8 2	3·68	6 12	3·06
Liverpool ..	1944	28	5 2	2·32	5 7	2·47	7 0	3·18	7 6	3·35
Camborne ..	1945	6	6 3	2·81	5 11	2·58	6 15	3·15	7 7	3·37
B.H.M.B., Woolwich	1944	17	5 0	2·27	5 3	2·35	6 6	2·89	7 3	3·26
" "	1945	20	4 10	2·10	5 3	2·35	6 4¼	2·84	7 4	3·32
" "	1946	11	6 0	2·72	5 12	2·61	7 11	3·49	6 8	2·95
" "	1947	19	5 3	2·35	4 5	1·96	7 4	3·29	7 7	3·37

As will be seen from the accompanying table, the average weights of twins, taken from several different hospital reports, range between 5 lb. and 6 lb. 3 oz. (2.27 and 2.81 kg.). The heaviest weights recorded in the series were 7 lb. 9 oz. and 8 lb. 8 oz. (3.43 and 3.85 kg.) at Queen Charlotte's Hospital in 1945.

Progress has been consistently good. Breast-feeding was maintained, apparently without strain, for eight months. At 3 months the babies weighed 13 lb. 8 oz. and 11 lb. 9¼ oz. (6.12 and 5.26 kg.). They had had no illnesses and were free from any sign of rickets. The haemoglobin level was found to be 60% in both cases, and iron was prescribed. When last seen on October 7 (aged 8 months) they weighed 22 lb. and 20 lb. 8 oz. (9.98 and 9.3 kg.) respectively and were very healthy.

My thanks are due to Mr. Keith Vartan, medical director, and Dr. Harold Waller, honorary paediatrician, for permission to publish this case and for their help and advice.

AILEEN P. M. DRING, M.B., B.S., D.R.C.O.G.,
British Hospital for Mothers and Babies, Woolwich.

REFERENCE

Waller, H. K. (1946). *Arch. Dis. Childh.*, **21**, 1.

Congenital Pyloric Stenosis in Three Successive Male Babies of the Same Parents

The following cases are reported in the belief that it is rare, if not unique, for the same parents to have three consecutive male babies suffering from congenital pyloric stenosis. It would be interesting to know if any readers have had similar experiences.

CASE REPORTS

Case 1.—This occurred in July, 1945. The precise clinical details are lacking except that the condition was diagnosed clinically and confirmed at operation. The child died shortly after the operation. It is believed that the general condition had greatly deteriorated before consent was given by the parents.

Case 2.—This occurred in July, 1947. The clinical features were classical in that projectile vomiting started at the end of the second week after birth. Visible peristalsis and a palpable mass were evident. Unfortunately, however, the family conditions left something to be desired, and the parents did not use the "eumydrin" with which the doctor was treating the case. Other therapeutic measures were carried out by the parents against the doctor's advice and operation was refused. Inevitably the general condition became worse, and when eventually the parents realized the folly of their ways the child died before operation could be performed. A post-mortem

examination was, however, carried out and a greatly hypertrophied pylorus was found with complete stenosis.

Case 3.—This occurred in July, 1948. The child was a male and the projectile vomiting started towards the end of the second week. Visible peristalsis and a palpable mass were again found after feeding. Treatment with 1/750 gr. (0.875 mg.) of eumydrin before feeds was begun, and from the outset the condition was good. On this occasion co-operation from the parents was forthcoming and it was possible to carry out a Rammstedt operation in the early stages. Recovery was rapid and uneventful.

J. L. ADLINGTON, M.B., Ch.B.,
Que Que, Southern Rhodesia.

Congenital Pyloric Stenosis in Binovular Twins

The aetiology of congenital pyloric stenosis is quite obscure. The constant pathological findings and the onset a few weeks after birth point to some defect in the development of the pylorus, widely assumed to be dependent on a genetic factor.

Individual reports of the disease in two or more siblings have appeared from time to time (Parker, 1927 ; Bilderback, 1928 ; Cockayne, Moncrieff, and Sheldon, 1928 ; Thompson and Gaisford, 1935 ; Fabricius and Vogt-Müller, 1937 ; Donovan, 1938 ; O'Donnell and Klein, 1941 ; Cathala and Cler, 1944 ; Marquezy, 1944 ; Kaufman, 1947). On the other hand, Akin and Forbes (1947) found only three instances in 147 patients, Nafe (1947) six cases in 129 patients, and Gavois and Poyanne (1944) one case in 67 patients. It is clear that it is unusual for siblings to be affected, although Cockayne and Penrose (1943) concluded, after a most exhaustive investigation, that there was a definite though small familial incidence.

Occasionally pyloric stenosis has occurred in successive generations. The father of the female patient reported by Donovan (1938) had undergone operation for stenosis when a few weeks old ; one of Nafe's (1947) patients had an uncle who had had the disease, as had the maternal aunt of the pair of twins reported by de Lange (1936). Schrieber (quoted by Laubscher and Smith, 1947) described a patient whose father and grandfather both suffered from pyloric stenosis in adult life, which was believed to be of congenital origin. Caulfield (1926) cited a further case that was even less convincing. Cockayne (1934) reported two pairs of twins who were first cousins, all of whom had the disease. The absence of any definite hereditary characteristics does not lend support to the genetic theory, but if a Mendelian recessive was concerned it would remain concealed for long periods, showing a tendency to exposure particularly on intermarriage ; and in respect of this Cockayne and Penrose (1943) found the proportion of patients with consanguineous parents exceeded random expectation.

Laubscher and Smith (1947), in a recent review on congenital pyloric stenosis in twins, found it recorded in 13 monovular twins ; in 11 of these both twins were affected, while Sheldon (1938) and Lasch (1925) each noted an exception. In 24 sets of binovular twins there were two instances in which both were affected. Laubscher and Smith (1947) reported binovular male twins, both of whom underwent operation five weeks after birth, and O'Donnell and Klein (1941) recorded a similar occurrence ; Nafe (1947) mentioned that he had recently seen binovular twins operated on for pyloric stenosis on the same day.

CASE REPORTS

The mother, a 2-para aged 33, gave birth to a male child on June 29, 1948 ; simultaneously the membranes of the twin were artificially ruptured, but the uterus became inert and the second child, a female, was not born until July 1. There was an elder child, a girl aged 6. No history was elicited of any similar trouble either in the mother's or in her husband's family, and the parents were not related.

First Twin.—Male, born June 29, 1948 ; birth weight, 6 lb. 2 oz. (2.78 kg.). He was breast-fed for the first fortnight, but then changed to a proprietary food. He thrived until July 21, when he vomited after one of his feeds. Three feeds later he vomited again, and thereafter following every bottle : the vomitus became large in quantity and projectile in nature. On July 23 he was admitted to Queen Mary's Hospital in a dehydrated condition, and weighing 5 lb. 3 oz. (2.35 kg.). A palpable tumour lay under the right costal margin, with visible peristalsis in the epigastrium. On July 24 the abdomen was explored under local analgesia. A firm pyloric muscle tumour was found, and a typical Rammstedt's operation was performed. The child made an uneventful and rapid recovery.

Second Twin.—Female, born July 1, 1948 ; birth weight, 4 lb. 2 oz. (1.87 kg.). She was maintained in an oxygen tent for five days, with three-hourly oesophageal feeds of a proprietary food. After a further three weeks in the premature baby nursery she was discharged home, on July 25, weighing 5 lb. 8 oz. (2.49 kg.). For a few days she continued to progress favourably, but on August 1 suddenly vomited after a feed, and thereafter shortly after every bottle ; with each vomitus a large quantity was ejected in projectile fashion. On August 3 she was admitted to the Connaught Hospital because of an outbreak of whooping-cough at Queen Mary's Hospital. She weighed 4 lb. 1 oz. (1.84 kg.), but was less dehydrated than her brother had been. Peristaltic waves crossing the epigastrium were easily visible ; and a mobile tumour was palpable under the right costal margin. She was given a feed and shortly after it was forcibly vomited. On August 3, under open ether anaesthesia, a Rammstedt's operation was performed for a typical congenital hypertrophied pylorus. Her post-operative progress was quite uneventful and she rapidly gained in weight.

COMMENT

A study of the published data, together with such cases as the one reported here, reveals the following : (1) the disease may occur in siblings, but with relative infrequency ; (2) it is rare for two or more generations to be involved ; (3) whilst each twin is usually affected when of monozygotic origin, authentic exceptions have been recorded ; (4) there have been several instances in which each twin of dissimilar pairing has been affected, such as the example reported here.

E. S. R. HUGHES, F.R.C.S.
H. A. D. SMALL, F.R.C.S
J. W. F. MACKY, F.R.C.S.

Queen Mary's Hospital, Stratford, E.15,
and Connaught Hospital, E.17.

REFERENCES

Akin, J. T., and Forbes, G. B. (1947). *Surgery*, **21**, 512.
Bilderback, J. B. (1928). *Northw. Med., Seattle*, **27**, 182.
Cathala, J., and Cler, R. (1944). *Arch. franç. Pédiat.*, **11**, 65.
Caulfield, E. J. (1926). *Amer. J. Dis. Child.*, **32**, 706.
Cockayne, E. A. (1934). *Lancet*, **1**, 898.
—— Moncrieff, A. A., and Sheldon, W. P. H. (1928). *Proc. R. Soc. Med.*, **21**, 1261.
—— and Penrose, L. S. (1943). *Ohio J. Sci.*, **43**, 1.
De Lange, C. (1936). *Arch. Dis. Childh.*, **11**, 39.
Donovan, E. J. (1938). *Amer. J. Surg.*, **39**, 377.
Fabricius, B., and Vogt-Müller, P. (1937). *Hospitalstadt*, **80**, 166.
Gavois and Poyanne (1944). Quoted by Marquezy (1944).
Kaufman, B. (1947). *Arch. Pediat.*, **64**, 1.
Lasch, W. (1925). *Münch. med. Wschr.*, **72**, 1155.
Laubscher, J. H., and Smith, A. M. (1947). *Amer. J. Dis. Child.*, **73**, 334.
Marquezy, R. A. (1944). *Arch. franç. Pédiat.*, **11**, 65.
Nafe, C. A. (1947). *Arch. Surg., Chicago*, **54**, 555.
O'Donnell, F. T., and Klein, J. M. (1941). *Amer. J. Dis. Child.*, **62**, 1025.
Parker, D. W. (1927). *Boston med. surg. J.*, **196**, 214.
Sheldon, W. (1938). *Lancet*, **1**, 1048.
Thompson, W. A., and Gaisford, W. F. (1935). *British Medical Journal*, **2**, 1037.

Reviews

A STUDY OF SICK SOCIETY

Psychosocial Medicine. By James L. Halliday, M.D., D.P.H. (Pp. 277. 17s. 6d.) London: William Heinemann Medical Books. 1948.

It has been clear for some time that this book was an unusual one. Since its appearance in the United States last year American colleagues have been asking, almost monotonously, how Halliday's book is being received. Last autumn, when Mr. Aldous Huxley interviewed the Press shortly after he arrived in this country, it was reported that the discussion turned to Halliday's book on psychosomatic illness, and more recently it appeared as the subject of a 20-minute talk in the third programme by Professor L. J. Witts. Its subtitle, *A Study of the Sick Society*, gives the clue to this wide interest, and here, indeed, is a disturbing picture of some of the sicknesses of the communities, and of the subgroups within them, of which we ourselves are so intimately a part.

The main theme may be put thus. Although the mechanismic outlook of nineteenth-century medicine led to brilliant advances against many physical illnesses, it diverted attention from other important aetiological factors, with the result that what are now called the psychosomatic illnesses have been getting progressively more common. It is not only that the total figures are rising. Halliday's essential point is that many of these illnesses have shown within the last few decades changes in their incidence in different age, sex, and occupational groups. For instance, peptic ulcer would appear to have changed from being an illness chiefly affecting young women and middle-aged men to one that is now more typical of young men and middle-aged women; or, again, the mining group in recent years has shown a higher rate of illness than other industrial groups. Furthermore, certain other features—e.g., infertility and suicide rates—have shown similar trends. According to Halliday, these findings can be accounted for only by social psychological factors, and he therefore suggests that such objective measures should be taken as indices of the sickness or health of any group or society. (It is because "social" medicine means in practice the measures designed to keep populations, or aggregates of people, from becoming sick through physical causes that he reluctantly adopts the term "psychosocial" to ensure that the psychological factors are included.) Halliday next takes the daring view that, when these indices are rising in a group, that group is in danger of a devitalizing biological change which can readily progress until the group is extinguished by failure to produce and to reproduce.

Having diagnosed the faults within the social sphere, the author goes on to suggest that medicine will have to be reintegrated with the social sciences and with politics, and that those doctors who effect this synthesis within themselves will become the pioneers of new ways in medicine which will lead us out of the present increasing specialism with its impotence in face of the most prevalent disorders in modern industrial society.

It is almost impossible to comment briefly on the condensed thought in this book. The first task, as the author himself suggests, will be to carry out further studies to confirm and to expand his findings, and to ascertain how fully all the relevant factors have been considered. To take one instance, in quoting the unduly high rates of hypertensive disorders in miners' wives the possible effects of this group having a relatively higher average age than other groups of wives does not appear to have been allowed for. More social anthropological data will be required, too, on the individual histories of the sick groups, for occupational groups are wont to have quite marked food habits. But even before this checking-up has been done it is difficult not to be impressed by the apparent psychosocial aetiology of some of the disorders mentioned. The history of miners' nystagmus is an excellent example of how too rigid an adherence to physical aetiology can blind us to the most relevant facts. If only a few of the main findings about the changing distributions of the psychosomatic illnesses are eventually accepted, serious thought will have to be given to the whole status of psychosocial factors in medical thought and practice; it will be difficult to "explain" these by such concepts as "bad nutrition" or "hereditary factors."

It may well be that medical historians of the future will write of this book as one of the important contributions to medical thought in the twentieth century. Almost every page reveals the unusual insight of the author and his capacity to analyse and synthesize the implications of his theme, so that there is the stamp of genius about the work as a whole. It is significant that the insights of the poets have evidently made deep impressions upon the author, and some of his views may be rejected for a time as poetic rather than scientific. That, however, will illustrate the author's view that it is not easy for us to face up to some aspects of our present society. In fact, one of the best object lessons in understanding psychosocial forces will be to watch the reception and fate of this book within the next few years by different professional groups, and to understand why it has stimulated some groups and made others anxious, as it almost certainly will do.

The appearance of *Psychosocial Medicine* is peculiarly well timed. One of the features of psychosomatic illnesses upon which the author comments is their tendency to be exacerbated by actions taken by doctors which show that they do not really understand their origins. Unless effective ways of combating these disorders can be developed there is bound to be a rise in their incidence and chronicity, so that the burden on the new Health Service will increase steadily; no national health service can afford to ignore Halliday's considerations.

As a final point, the reader can speculate on whether it was a sickness of some of the groups in our British society which led to this fundamental book being produced in America and so to making a Glasgow physician write about "gasoline engines."

J. D. Sutherland.

B.C.G.

B.C.G. Vaccination in Theory and Practice. By K. Neville Irvine, D.M. With foreword by Konrad Birkhaug, M.Sc., M.D. (Pp. 130. 9s. 6d.) Oxford: Blackwell Scientific Publications. 1949.

This is an excellent little book, written for the practical man who is going to use B.C.G. and wants to know the "why" and "how." It is well documented, and the references, which are given at the end of each chapter, number over 500. The author covers the history and present methods of producing the vaccine, discusses its safety, describes in detail alternative methods for the vaccination of human beings, reviews the experimental and field evidence on the protective value of B.C.G., and ends with a brief discussion on its best mode of use in Great Britain. He gives a good deal of space to the safety of the vaccine, pointing out that all the adverse reports, whether in animals or in man, date from before 1930. He believes that about that time potentially virulent variant organisms were eliminated from the vaccine and that now the danger is that the strain may become too avirulent to afford adequate protection. The safety of B.C.G. is attested by the fact that some ten million persons have been vaccinated with it and, apart from the Lübeck disaster, only 37 cases of tuberculosis have, rightly or wrongly, been attributed to its use.

The real question to-day is not whether B.C.G. is safe but what is its protective value in different age groups of the population and among people of varying levels of genetic immunity. Before recounting the investigations made to determine this the author lays down seven minimum postulates for a field trial if it is to be accepted by the statisticians. Whether it will be possible to carry out a properly controlled trial in this country is doubtful, but there seems no reason why one should not be attempted if the Ministry refrains from distributing the vaccine indiscriminately.

It would be interesting to know why the author has ignored the negative results of the large-scale use of B.C.G. by Blanch,

Blanch, and Lieutier in Uruguay. Little attention has been paid in the literature to these findings, and Dr. Irvine, who has gone to considerable trouble to make certain of many of his facts, might well pay a visit to South America to find out the real truth about them. Another point that needs investigation is the need for segregation of children in tuberculous families before and after vaccination. Dr. Irvine recommends the approved practice, but there seems to be an increasing tendency in some countries to dispense with it. What we really want to know is whether Rosenthal in Chicago and Levine and Sackett in New York are both right. Is it true that B.C.G. with segregation protects and without segregation it does not?

Throughout the book the author is simple, sane, direct, and objective. Only occasionally does he lapse. For example, in his final discussion he summarizes an earlier section in these words: "This chapter shows that vaccination does produce a definite resistance in man; the degree produced appears to be 70–100%." What does this mean? It cannot mean what it appears to mean—namely, that without vaccination 70–100% of the vaccinated persons would have developed tuberculosis. What the author probably means is that vaccination protected 70–100% of the small proportion of the population that would have developed tuberculosis had they not been vaccinated—which is a very different thing. It is to be hoped that in a future edition the original statement, which may be quoted away from its context, will be revised. Again, on page 93 the author quotes Hertzberg as saying, "For primary tuberculous lesions the ratio of the vaccinated morbidity rate to that of the controls is 1:137," and follows this up with the statement: "Neiman and Loewinsohn, in a radiological study of 1,417 vaccinated children and 1,414 controls, found the ratio per 1,000 person-years to be 1:2.83." Surely an explanation is required of these totally discrepant findings.

In recommending the wider use of B.C.G. vaccination Dr. Irvine makes it clear that it should be used as an addition to our antituberculosis measures, not as a replacement for any of them. Most workers will agree that so long as this is firmly borne in mind there is a place for B.C.G. vaccination in this country.

G. S. WILSON.

LEWIS'S CARDIOLOGY

Electrocardiography and Clinical Disorders of the Heart Beat. By the late Sir Thomas Lewis, C.B.E., F.R.S., F.R.C.P. (Pp. 285; illustrated. £1 5s.) London: Shaw and Sons. 1949.

It is almost superfluous to review a book by the late Sir Thomas Lewis, for there is no medical writer of the last generation who has transmitted to paper in such clear prose work of such a high standard. The present book is a combination of two previous volumes, *Clinical Disorders of the Heart Beat* and *Clinical Electrocardiography*. It was completed just before the author's death, and, as is said in the preface, he felt that the time had come for integrating the subjects into one volume. This book is one which must necessarily be included in the libraries of medical institutions and which should be at hand for reference by all cardiologists. This is not only for historical reasons but because the clear sentences of the book contain a fund of valuable and stimulating information, some of it with a very clear personal ring.

It is always possible for a reviewer to read his volume with jaundiced and hypercritical eyes, and, even in the case of writings by Sir Thomas Lewis, minor points of criticism can be found. For example, on page 6 it is advised that the subject whose electrocardiogram is being taken should be in a sitting position. It is my experience that the broader and more comfortable the couch the freer the tracing from muscular interference. On page 21 are given three normal curves taken from lead III in different subjects. One of these could easily be that of a patient who had previously suffered from a posterior coronary infarct. On page 58, where a curve characteristic of Fallot's tetralogy is shown with marked right axis deviation, the characteristically sharp P wave, which is also well defined, is not remarked upon. However, these are small samples of the hypercritical attitude already referred to.

There are certain broader criticisms which can be justifiably added. The book makes little mention of the direct chest leads, and where these are referred to the information is usually restricted to the curves shown by CR4. With the great advance in electrocardiography and the advent of the school which already prophesies the complete disappearance of the three standard leads, it is clear that this omission, so far as electrocardiography is concerned, is a serious one. But such omissions are inseparable from the passage of time, and they do not in themselves constitute criticism of the book. For students who desire a work on cardiology as a book of reference this monograph is not in itself sufficient, for there is no section on cardiac radiology.

When these remarks have been made, it still remains a fact that the description of cardiac irregularities, which are dealt with seriatim in separate chapters, remains classical both in presentation and subject-matter. It is sad, however, that there is no wide, comprehensive textbook on cardiology from the hand of the man who was in so many senses the father of his subject.

GEOFFREY BOURNE.

ESSAYS IN PSYCHO-ANALYSIS

Searchlights on Delinquency. Edited by K. R. Eissler, M.D. (Pp. 456. 30s.) London: Imago Publishing Co. 1949.

These psycho-analytic studies on delinquency are dedicated to a remarkable man, August Aichhorn, a Viennese educationist who devoted himself to the study of delinquent youth and eventually found in psycho-analytical teaching the framework he required for understanding his patients and treating them. He was apparently a strong pacifist, and in 1907 successfully exerted his influence against intrusion of the military spirit into education. He later founded an institution for delinquent boys, with whom he had extraordinary success. This institution foundered during the last war but has since been re-established, and Professor Aichhorn's work has been honoured by his election to the presidency of the Viennese Psycho-analytic Society. The editor of this symposium writes of him as an artist in technique, a unique teacher, and as having uncanny intuition. He can "reconstruct the whole of a human personality from a few meagre details which seem only trifling superficialities to the unintuitive." He will spend time arguing with a schizophrenic adolescent about the interpretation of an obscure passage in the Bible, with the result that, week by week, the patient recovers. Even his psycho-analytical colleagues emphasize how much of his success is attributable to personal factors. They have contributed to this book many scholarly articles which will be of great interest to analysts practising in this field.

ELIOT SLATER.

THE RETICULOSES

La Réticulose Histiomonocytaire. By P. Cazal. (Pp. 196. 350 francs.) Paris: Masson et Cie.

Reticulosis and Reticulosarcomatosis. By P. van der Meer and Dr. J. Zeldenrust. (Pp. 83; 21 figures. 40 florins.) Leiden: Universitaires Pers Leiden. 1948.

Dr. P. Cazal's monograph is worthy of study by all who are interested in the reticuloses. The author defines the condition he is describing as including those reticuloses which pursue a rapidly fatal course, and which may under certain circumstances produce a leukaemic blood picture. Letterer-Siwe disease and histiocytic medullary reticulosis are included in this definition. He describes in considerable detail the manifestations of the disease process throughout the body, and his references to abnormal blood pictures are of particular interest, for he develops the thesis that proliferation of histiocytic cells in the tissues may appear in the blood stream as cells of the monocytic series, either well or poorly differentiated. The suggestion is put forward in connexion with the pathogenesis of this condition that it represents a multifocal disease rather than a malignant tumour spreading by metastasis.

The author's opinions are best summarized by quoting his final sentence: "Reticulose histiomonocytaire: maladie caractérisée par la prolifération métaplasique (c'est-à-dire envahis-

sante, irréversible et s'accompagnant d'atypie cellulaire) et systématisée des cellules réticulaires et histiocytaires qui peuvent soit rester sur place, soit passer dans le sang sous forme de monocytes plus on moins typiques." Despite the fact that some of the views put forward in this monograph may not be fully acceptable to all workers, a most stimulating contribution to a confused subject has been presented.

The work of Drs. van der Meer and Zeldenrust from the University of Leiden sets out to present a clinico-pathological account of diseases of unknown aetiology associated with the reticulo-endothelial system. Little new in this confused field of study is presented, and the review of literature is largely confined to that coming from the Continent, American contributions being largely ignored. The fundamental concept is retained which divides diseases of supposedly hyperplastic origin from those which are thought to be true malignant tumours and applies the separate titles reticulosis and reticulosarcoma to them. No new evidence, either clinical or pathological, is presented to substantiate this claim, however.

The reticuloses are described as acute or chronic, but little attempt is made to correlate this clinical subdivision with pathological entities. Reticulosarcomata are described as being localized or generalized, but no stress is laid upon the prognostic significance of these varieties. The authors' presentation suffers from an inadequate English translation which makes it difficult sometimes to follow their reasoning.

GEORGE LUMB.

MODERN PRACTICE IN PSYCHIATRY

Modern Practice in Psychological Medicine, 1949. Edited by J. R. Rees, M.D. (Pp. 470 and an Appendix. £2 10s.) London: Butterworth. 1949.

The editor explains that this well-produced volume is intended for medical students and general practitioners, not for specialists in psychiatry. He has invoked the aid of twenty-eight collaborators with widely different backgrounds and viewpoints, who have contributed essays on the topics assigned to them. The result is a most uneven production with much overlapping and repetition and some regrettable omissions. The treatment recommended varies, and sometimes flatly contradictory opinions are expressed. Difficulties of this kind are likely to arise in any symposium in default of the most rigorous editorial planning and pruning, but they are specially likely to arise in a relatively short volume on psychological medicine which covers an undefined field without proper delimitations between the different parts of it.

In view of the title the medical student and general practitioner may reasonably expect to find clear guidance on practical problems of diagnosis and treatment, but both may be excused if at times they feel baffled and bewildered by the work. In particular, the therapeutic implications of expositions in terms of "dynamic" psychopathology are puzzling to the reader, for they seem to lead to the deduction that patients should be analysed, which, it is then pointed out, is for the specialist. The chapter on physical methods of treatment is disappointing: and what is the beginner likely to make of such *obiter dicta* as that of Dr. Brock Chisholm, who identifies "amongst factors that commonly tend to slow, to distort, or to prevent satisfactory mental and social development . . . teaching of children to believe in the reality of phantasies such as fairies and Santa Claus. . . "?

In brief, the book does not fulfil its intended purpose, as a random collection of essays on psychiatric topics can scarcely be expected to do. Yet in spite of the lack of editorial planning both student and general practitioner could gain much from it, for in parts the symposium is not only good but excellent. The section on sexuality and the sexual disorders, by Professor D. Ewen Cameron, and that on psychosomatic medicine, by Dr. E. D. Wittkower, both contain much interesting matter; while among many valuable essays "Nature and Nurture—The Factor of Inheritance," by Dr. Eliot Slater (which is all too short), "Psychiatry and Neurology," by Dr. Russell Brain, "Mental Deficiency," by Dr. E. O. Lewis, and "The Schizophrenic Disorders," by Dr. Hunter Gillies, are outstanding.

DESMOND CURRAN.

BOOKS RECEIVED

[Review is not precluded by notice here of books recently received]

Acute Injuries of the Head. By G. F. Rowbotham, B.Sc., F.R.C.S. With a foreword by Professor Norman Dott, C.B.E., F.R.C.S.Ed. 3rd ed. (Pp. 480; 259 illustrations. 35s.) Edinburgh: Livingstone. 1949.

The Elements of Genetics. By C. D. Darlington and K. Mather. (Pp. 446. 25s.) London: George Allen and Unwin. 1949.

Sexual Behaviour, Normal and Abnormal. By E. Chesser. (Pp. 220. 21s.) London: Medical Publications. 1949.

English Social Services. By E. W. Cohen. (Pp. 169. 8s. 6d.) London: George Allen and Unwin. 1949.

Sanitary Science Notes. By H. Hill, F.R.San.I., F.S.I.A., A.M.I.S.E., and E. Dodsworth, M.R.San.I., M.S.I.A. 2nd ed. (Pp. 135. 7s. 6d.) London: H. K. Lewis. 1949.

The P.J. Poisons Guide. 5th ed. (Pp. 46. 3s. 6d.) London: The Pharmaceutical Press. 1949.

Ward Administration. By M. Randall, R.N., M.A. (Pp. 326. 20s.) Philadelphia and London: Saunders. 1949.

Psychology and the Nurse. By F. J. O'Hara, C.S.C., Ph.D. 3rd ed. (Pp. 253. 14s.) Philadelphia and London: Saunders. 1949.

Laboratory Manual of Chemistry. By J. I. Routh, Ph.D. 2nd ed. (Pp. 98. 6s. 6d.) Philadelphia and London: Saunders. 1949.

The Cerebral Palsies of Childhood. By H. K. Lucas, M.Ch.Orth., F.R.C.S.Ed. (Pp. 28. 1s. 9d.) Sanderstead, Surrey: British Council for the Welfare of Spastics. 1949.

Perspectives in Medicine. The March of Medicine, 1948. (Pp. 163. 14s.) London: Geoffrey Cumberlege. 1949.

Blakiston's New Gould Medical Dictionary. Edited by H. Wellington Jones, M.D., N. L. Hoerr, M.D., and A. Osol, Ph.D. (Pp. 1,294. $8.50.) Philadelphia and Toronto: The Blakiston Company. 1949.

Marihuana in Latin America: the Threat it Constitutes. By P. O. Wolff, M.D., Ph.D., M.A. (Pp. 56. $1.50.) Washington, D.C.: The Linacre Press. 1948.

Nelson Loose-Leaf Medicine. Renewal pages.

Hygiène et Securite du Travail. By M. Marchand. (Pp. 332. No price). Lille: Martin-Mamy, Crouan, and Roques. 1949.

La Enfermedad de Addison. By G. Marañón and J. F. Noguera. (Pp. 212. No price.) Madrid: Espasa-Calpe, S.A. 1949.

Fünfzig Jahre Pathologie in Deutschland. By W. Fischer and G. B. Gruber. (Pp. 334. M. 33.) Stuttgart: Georg Thieme. 1949.

Die Wiederherstellungs-Chirurgie. By K.-E. Herlyn. (Pp. 200; 357 illustrations. M. 32.) Stuttgart: Georg Thieme. 1949.

Die Pathologie des Harnleiters im Rontgenbild. By A. Thelen. (Pp. 97. M. 10.50.) Stuttgart: Georg Thieme. 1949.

Das Lange Becken. By H. Kirchhoff. (Pp. 153. M. 19.50.) Stuttgart: Georg Thieme. 1949.

Prognose und Therapie der Geisteskrankheiten. By M. Müller. 2nd ed. (Pp. 217. M. 16.50.) Stuttgart: Georg Thieme. 1949.

Weitere Fortschritte in der Blutgerinnungslehre. By K. Lenggenhager. (Pp. 251. M. 22.) Stuttgart: Georg Thieme. 1949.

Über Zwischenhirnsyndrome. By F. Laubenthal. (Pp. 47. M. 3.60.) Stuttgart: Georg Thieme. 1949.

Das Adenocarcinom des Collum Uteri. By H. Limburg and K. Thomsen. (Pp. 87. M. 6.80.) Stuttgart: Georg Thieme. 1949.

Funktionelle Pathologie in der Chirurgie. By C. van Gelderen. 2nd ed. (Pp. 206. M. 18.60.) Berlin: Springer. 1949.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY OCTOBER 1 1949

DISTINCTION AWARDS FOR CONSULTANTS

When the report of the Spens Committee on the remuneration of consultants and specialists was published in June, 1948, we criticized the suggestion for special awards as "the one outstandingly unsatisfactory proposal in a report which is likely to commend itself to those who work as consultants and specialists in the new Service." We expressed the hope that consultants and specialists would give their opinion on this matter so that it should not become accepted policy merely by default. There was at the time little response to this suggestion, but now that groups of consultants all over the country are being invited by the Distinction Awards Committee to select suitable candidates from among their colleagues, consultants, as is clear from our correspondence columns, are beginning to voice some disquiet. In a letter to this *Journal*[1] Dr. F. M. R. Walshe pungently expressed what a number of consultants in this country probably think about the proposed method of distributing what have been misleadingly called prizes. They are pensionable increments to income. Dr. Walshe has found support for his views, not least in the letter which appeared in the *Journal* of August 27 signed by 19 members of the consulting staff of a teaching hospital, who expressed the hope that "it is not yet too late to abandon the idea of distinction awards in its present form." A cold note of caution was sounded by Dr. H. E. A. Boldero, who stated that there is no alternative to the present method of distributing these distinction awards to consultants. He writes: "I speak from the book when I say that there will be no substitute. Money for these awards will not be available for any other purpose, such as an all-round addition to basic salaries." Dr. Boldero no doubt weighed his words carefully, though one may presume that the final authority in these matters is the Minister of Health. It may well be true that no other alternative will be accepted by the Minister, and that on grounds of common prudence the profession would not wish to make any move which would diminish its total income. But it must nevertheless take into account the views of those young consultants who through these columns have expressed their distaste and apprehension of the present scheme of making the Spens awards. If no alternative can be found, then with good grace we must accept the second best.

We suggested over a year ago that the additional money available should be attached to posts in the new hospital service demanding men of the highest calibre. The new hospital and consultant service is still in a formative period. Those responsible for its working have been overwhelmed with problems of organization, and little constructive thought has yet been put into the development of hospital policy. Some constructive proposals were made in a special number of the *Practitioner* by the writer of the article "The Surgeon and the Service." He suggested, for example, that a small group of senior men should have the task of co-ordinating the surgery of a region or district "by advice, by telling one hospital of the work being done at another, by advising on particular cases, and by informing regional headquarters where, and by whom, good work is being done." As the hospital service evolves one would have thought that some such idea as this would gather force, and that in each region there would be room and need for outstanding consultants in medicine, surgery, obstetrics and gynaecology, to carry out the work suggested by the writer in the *Practitioner*. Similarly, there are other jobs requiring long training and highly developed skill such as neurosurgery and thoracic surgery which will spread over one or more regions. Such posts demanding special responsibility or special skill are bound, we suggest, to be created in the National Health Service, and it is an obvious corollary that to these posts, whether whole- or part-time, there should be attached salaries higher than what has been called the basic salary for the ordinary consultant and specialist. For such special posts there would be keen and open competition and open selection.

If the profession has to accept the present scheme then it must look very closely into the method now being adopted. It has been suggested to the chairmen of medical committees of teaching hospitals that three or four members of each committee should meet in secrecy to decide who among their colleagues should be graded first, second, or third class, and to forward their recommendations to the Distinction Awards Committee. We understand that outside teaching hospitals the suggestion has not been made to the Regional Hospital Boards but to the Assessment Committees, whose decisions on grading have already come in for a certain amount of criticism. Whether the criticism is justified is beside the point. These groups of consultants all over the country being asked to grade their fellow-consultants in secrecy are being placed in a highly invidious position. Clearly they cannot recommend themselves, and it may be presumed that the Central

[1] *British Medical Journal*, August 13, p. 383.

Distinction Awards Committee will find it difficult not to give them awards, because they have already been put into the position of judges and therefore acquiring merit. The Central Committee will have the difficult task of deciding who among the selectors in the regions are to receive the first, second, or third prize, the men themselves feeling no doubt that they are meeting together as equals. There is surely something distasteful in the issuing of confidential reports on colleagues who will remain in ignorance of what is said about them. Granted that it would be possible in such a varied profession as medicine to weigh the merit of one kind of worker as against another kind, to assess for example the merits of a professor of bacteriology as against those of an abdominal surgeon, what criteria are to be adopted to guide those faced with this almost impossible task? At its meeting last week the Central Consultants and Specialists Committee, uneasy about the situation, decided at once to look into this question. If there is to be an attempt to assess merit, then there is much to be said for what appears at first to be a fanciful suggestion put forward by Mr. Frederick Ridley in the *Journal* of September 3—namely, the award of marks for certain distinctions already held by those eligible for the Spens awards. The essential thing is to adopt some method that will eliminate as far as possible the bias of judgment which any medical man must inescapably have in relation to a colleague who practises the same profession. To pretend that bias will not operate is to ignore an obvious but unpleasant fact. To find a method of eliminating bias which is as objective as possible should be the first task of the Distinction Awards Committee, so that some uniform method of assessment can be adopted all over the country.

We have no doubt that the Committee will perform its arduous duty with all the efficiency and impartiality it can bring to bear on it. But to adopt a *laissez-faire* attitude to the Distinction Awards would, we are convinced, be a disservice to medicine, because what is decided now will have an important influence on the healthy evolution of the Hospital and Consultant Service of Britain. *Reculer pour mieux sauter* is a sound adage.

A YEAR OF N.H.S.

"How is the National Health Service working out?" is one of the first questions a foreigner will put to a British doctor. And the usual answer is, "It is far too early to say." In any case the British doctor is so deeply immersed in it, and incidentally so overworked, that he is little inclined to concern himself with the generality of things; the particular overwhelmingly engrosses him. The extra number of the *Practitioner*, just published, has therefore performed a timely service in attempting to review the "first year's working." This it does in a series of articles the value of which is somewhat diminished by the fact that they are anonymous. This in itself is a portent. Men working in a "service" hesitate to put their names to anything in the nature of a criticism of it. The same tendency may be seen in the correspondence columns of this *Journal*. The real danger of a service in which men and women are employed by the State—or, at least, paid by the State—is that they will tamely acquiesce in things they dislike, or hesitate to put their names to forthright criticism. This may lead, in Medicine, to a sapping of that essential of democracy—free discussion. The editor of the *Practitioner* considers that anonymity is essential "when the chief concern is that writers should speak their mind with complete freedom, uninfluenced by the desire to please their friends or placate their enemies, to escape the labels of 'traitor' or 'reactionary,' and when, as in several instances in this number, the article is a symposium embodying the views of several men." It is a sad and sorry comment on Medicine to-day to admit that only under the cloak of anonymity is it possible to speak the mind with complete freedom on what the same editorial describes as "one of the greatest ventures in the history of medicine."

One aspect of this great venture is looked at in the article reviewing the Service as a whole—the difficulties placed in the way of the private patient needing hospital treatment. The charge per hospital room for the private patient has greatly increased, and "when it was found that in many hospitals the private beds were by no means full the regulation was made that at least one-third of the private beds should be allotted as amenity beds for patients applying for treatment through the Service." This, according to the same article, "led several busy consultants to take more of their work to private nursing-homes." It is suggested that this tendency will increase unless the official attitude to the provision of private-patient beds in hospitals is changed. Yet the writer of the article on "The Physician and the Service" states that "the so-called 'amenity beds' allowed for in the new scheme of things are noticeable only by their absence." He, too (or they?), notes (or note?) that the nursing-homes are well filled. The author of the stimulating article "The Surgeon and the Service" considers that the "position of the teaching hospitals as consultative centres, in England at any rate, appears to have deteriorated within the past year." The beds, he states, are blocked by the chronic sick; the out-patient departments are no longer "courts of appeal" but tend to become "routine clinics"; "radiodiagnosis is worse in quality"; pathological reports are "less informative, accurate, and reliable." This, he

considers, is largely due to an increase in routine work, but is in part "due to the fact that the workers are now 'ten-to-five office doctors' who have little personal interest in their relations with the clinical staff or their patients." There is in the *Practitioner* symposium no article by a radiologist, or a pathologist, or a biochemist, or a bacteriologist against which one can offset this criticism, which reads as if it were the experience of one observer rather than a fair commentary on the experience of hospitals generally. The writer voices a complaint, surely widely held, about the amount of time spent on paper work and on committees, commissions, and advisory boards. He complains, too, of the drastic reduction of the senior surgeon's income. "He may still charge no more than a junior may charge for removing a ruptured appendix." And he finds—as so many others find—that "the prospect of being rewarded according to the assessment of a witenagemot of worthies, instead of, as heretofore, in proportion to the place they have made for themselves, is humiliating."

The physician seems to be less alarmed about his financial status than is the surgeon: "Incomes," he writes, "are about back to what they were." He notes that the departments of pathology, cardiology, and physiotherapy have been grossly overloaded with work —"one of the best examples of how the haste in which the Service was introduced has led to confusion." The obstetrician, in his contribution to the symposium, seems less concerned about remuneration than are the physician and the surgeon, though he, too, deplores the financial obstacles placed in the way of the use of the private bed in hospital. He devotes (or it may be "she") much of his article to advocacy of the proposals for a national maternity service published by the Royal College of Obstetricians and Gynaecologists in 1944. He repeats the familiar and accepted criticism that, with the general practitioner responsible to the executive council, the midwife to the local health authority, and the obstetrician to the regional board or board of governors, co-ordination of work is difficult. An attack is made on the "general-practitioner obstetrician wielding the forceps . . . because of sheer financial necessity imposed on him by the workings of the Health Act." This is a matter to which we shall return in a subsequent issue, content to observe here that if there is any justification in the attack it is the biggest condemnation there could be of the failure of obstetricians to instruct students properly in the teaching hospitals of this country.

The "country practitioner" and the "town practitioner" are at one in noting the great increase of work falling on them as a result of the National Health Service. In this they are supported by the author of the article "The Ministry and the Service"—presumably an officer of the Ministry of Health, for who else could write with knowledge? This work has increased both in densely populated areas and also in places where private practice used to predominate, "as the patients made greater demands in proportion to their numbers." In the same article it is stated that more than 95% of the population are using the Service and the same proportion of general practitioners have entered it. Similar evidence of increased work comes from the writer(s) of the article on the Service in Scotland, with the observation that "only the absence of a major epidemic last winter enabled busy practitioners to struggle through at all." Along with this overwork is a well-founded anxiety that general practice is losing much of its savour. The country G.P. refers to the "strong temptation to refer a patient early instead of sharpening one's wits upon the case." On his exclusion from the cottage hospital, he observes that "no doctor of any character will be content for the rest of his days just to dance attendance on specialists or consultants as a 'clinical assistant,' particularly when in many instances he has had more years of practice than the 'specialist' has had of life." The town G.P. echoes this thus: "The general practitioner wants to feel he is actively engaged in *medicine* rather than providing a sort of clearing station for the disposal of cases." Two newly qualified practitioners, giving the viewpoint of the "young doctor," note that "the ideal of general practice is now under a cloud; he cannot be physician, adviser, and friend of his patients." They observe that many who formerly would have made "good and happy general practitioners have entered a field where they will be only lukewarm specialists." And from Scotland comes the warning that the general-practitioner service "must not be allowed to deteriorate into the last resort for disappointed hospital trainees." The growing unattractiveness of general practice is the most serious repercussion of the National Health Service on the development of medicine in Britain.

It is not easy to sum up the impressions gathered from the *Practitioner's* symposium. Several writers deplore the haste with which the Service was introduced and regret that the advice to bring it in by stages was ignored by the Minister of Health. For this he gave his own reason in an interview with Mr. John W. McPherrin, editor of the *American Druggist*, a recent issue[1] of which was devoted to an examination of the National Health Service. As reported, Mr. Bevan said: "To do it gradually, piece by piece, step by step, would create many resistances and make the Minister subject to everyone else instead of having them subject to him. It is his responsibility to make the new system work, and he cannot do that if he is not master, if he does not have complete control." In the symposium surveyed briefly above there emerges the picture of a profession doing

[1] *American Druggist*, July, 1949, p. 92.

its harassed best to make the National Health Service a going concern. Mr. Bevan's haste and mistakes have to a large extent been masked by the self-discipline of the individual doctor, whose adherence to the traditions of a learned profession makes it possible for him to withstand the vagaries of the political climate. But the Minister—and the Ministry of Health—should take heed of this comment from the writer on the Service in Scotland: "The men who work it, however, are not, in general, working in a contented state." If medicine is to continue to attract into its ranks able men and women it is above all imperative that the terms and conditions of service should so evolve as to produce a profession which will do its work in a happy and contented frame of mind.

SERUM JAUNDICE

"Blood and plasma are potentially dangerous fluids unless prepared, stored, chosen, and used with extreme care." This statement was emphasized more than a year ago in these columns.[1] Blood and plasma are still being used in larger quantities than during the war and the need for "extreme care" has not grown less. Lehane and his colleagues[2] in a recent issue of the *Journal* discussed serum jaundice as one of the hazards of transfusion therapy. In the last few weeks three children have died after the administration of anti-measles serum, and the inquests on these cases, reported elsewhere in this issue, have been given prominence in the lay press.

It was in 1936 that a few cases of jaundice occurred among the recipients of two pools of serum from apparently normal adults given as a measles prophylactic[3] and in people inoculated with certain batches of yellow fever vaccine containing human serum.[4] The clinical picture in these patients was similar to that of "catarrhal jaundice," but because the period between the injection and the onset of symptoms was two to four times as long as the presumed incubation period of catarrhal jaundice the implications were not appreciated at first. Further investigation of the origin of the disease in both groups suggested that the supposedly normal serum used might contain an icterogenic agent. Although it was shown that the yellow fever virus itself was not responsible in the patients who had received the suspected vaccine, no proof of the source of the icterogenic factor was obtained at that time. Some changes were made in the process of preparation of yellow fever vaccine in 1937, but human serum was still used, because certain experiments indicated that it was necessary for growth of the virus and to maintain the stability of the virus in the vaccine. No more cases of jaundice of this kind were recognized until 1940 in Brazil, where many batches had been given previously over a number of years with no ill effects. Further large outbreaks of jaundice were reported in 1941–2 among the recipients of batches of yellow fever vaccine made in the U.S.A., and in 1942 in England. By this time improved technique made it possible to change over to a vaccine with an aqueous base, and no further cases are known to have occurred since 1943, when this type of vaccine was introduced.

Soon after the beginning of the recent war infective hepatitis (catarrhal jaundice) reached epidemic proportions in military and civilian groups as it had in previous wars. At the same time jaundice was affecting many of the men undergoing treatment at some of the military treatment centres for venereal disease. It was realized, too, that jaundice was also appearing in patients who had been transfused about 60 to 120 days previously. Usually the patients had received different batches of plasma or of whole blood and plasma, and there was no proof that the disease was artificially produced and not contracted by contact. About the same time two pools of plasma were collected from two small groups of apparently healthy young recruits recently recovered from mumps and were used to inoculate several hundred soldiers in the same camps to protect them from mumps. Some 60 days later cases of jaundice were noted among the inoculated personnel, and eventually at least 37% of them developed jaundice.[5] The investigations that followed incriminated only one of the two pools of plasma. There was no suggestive history of catarrhal jaundice among the donors, either before or after the time they had been bled. These results, together with the demonstration by Oliphant and others[6] in the U.S.A. that the disease produced by icterogenic yellow fever vaccine could be transmitted by injection of the patients' blood, and MacCallum and Bauer's experiment[7] showing that the pool of normal human serum incorporated in an icterogenic vaccine was itself icterogenic, made it clear that the serum of certain normal individuals contained a transmissible agent which produced a clinical picture similar to that of catarrhal jaundice. Biopsy specimens of the liver from some of the patients showed that the pathological changes in the liver resembled those of infective hepatitis.

Then Spurling, Shone, and Vaughan[8] reviewed in this *Journal* their experience over the years 1940–5 at a large London blood transfusion centre. A disease considered

1 *British Medical Journal*, 1948, **1**, 649.
2 Ibid., 1949, **2**, 572.
3 Propert, S. A., ibid., 1938, **2**, 677.
4 Findlay, G. M., and MacCallum, F. O., *Trans. R. Soc. trop. Med. Hyg.*, 1937, **31**, 297.
5 McFarlan, A. M., and Chesney, G., *Lancet*, 1944, **1**, 816.
6 *Publ. Hlth Rep. Wash.*, 1943, **58**, 1233.
7 *Lancet*, 1944, **1**, 622.
8 *British Medical Journal*, 1946, **2**, 409.
9 Scott, K. B., and Tovey, G. H., ibid., 1948, **1**, 196.
10 Apley, J., and Wallis, H. R. E., ibid., 1948, **1**, 197.
11 Havens, W. P., *J. exp. Med.*, 1946, **83**, 251.
12 Neefe, J. R., *et al.*, *J. clin. Invest.*, 1947, **26**, 329.
13 *J. exp. Med.*, 1946, **83**, 441.
14 *J. clin. Invest.*, 1944, **23**, 417.
15 Blanchard, M. C., Stokes, J., Hampil, B., Wade, G. R., and Spizizen, J., *J. Amer. med. Ass.*, 1948, **138**, 341.

to be serum jaundice was found to have affected 7.3% of 1,054 recipients of pooled plasma. These were the years when infective hepatitis was prevalent in this country. Now Lehane and his colleagues have carried out a similar survey from October, 1945, to March, 1948, in the Liverpool area. Although the incidence of jaundice in the population was probably at pre-war levels and much lower than in the war years, the jaundice attack rate in recipients of large-pool plasma was 11.9%, and even in those receiving whole blood or small-pool plasma (not more than 10 donors) the rate appeared to be considerably higher than that in the community at large.

Attempts to reproduce either serum jaundice or catarrhal jaundice in experimental animals have been unsuccessful, and no *in vitro* diagnostic test is available; elucidation of the problem has therefore been difficult. Much of our knowledge has been obtained by experimental inoculation of human volunteers, with all its accompanying pitfalls. We still do not know whether these are two forms of the same disease process or not, but it is possible that there are several viruses or strains of viruses which have slightly different modes of action in their human host. In addition to several apparent differences in routes of infection and excretion between the agents causing infective hepatitis (catarrhal jaundice) and some of those responsible for so-called serum jaundice, there has been one important epidemiological difference—that of age incidence. Naturally occurring infective hepatitis has a maximum incidence in those aged 5–15 years. Occasional frank cases occur under 5 years of age, but even in nurseries it is usually the young teen-age nurses who contract the disease, while the children remain free. Over 15 years of age the attack rate in the civilian population usually falls gradually until 35 years, after which age the disease is uncommon even in groups of military personnel. By contrast, serum hepatitis has been very uncommon under the age of 5 and uncommon from 5 to 10, but it affects adults of all ages with more or less equal frequency, the attack rate varying from 15 to 50% in different outbreaks. Several cases of jaundice occurring two to four months after the transfusion of infants in the first few months of life have recently been reported in the U.S.A. and in England.[9 10] The source of the infection could not be determined. The possibility of the transfused material being responsible was inferred from the "incubation" period. Lehane and his colleague found only one case (aged 9 years) of jaundice (0.8%) among 127 children under 10 who were transfused with pooled plasma or plasma and blood, and there were no cases among 87 children who received blood alone. The attack rates by 10-year age groups from 10 to 70 were 5.7, 6.8, 7.1, 9.1, 9.3, and 8.1%, respectively.

It is well known that when infective hepatitis is epidemic there are large numbers of patients who have symptoms of the disease but do not become jaundiced. It has been inferred that at the same time there may be a number of individuals who have a symptomless infection during which the virus would be circulating in their blood. Transmission experiments in volunteers have failed to reveal any evidence that the patient recovered from infective hepatitis, or the one who develops chronic hepatitis, continues to carry the virus in the blood or excrete it in the faeces.[11 12] Similarly, Oliphant and others, MacCallum and Bauer, and Havens[13] have all failed to find any evidence of an icterogenic agent in the serum of cases of serum jaundice two months or more after their attack. In a follow-up of donors in Lehane's investigations only one could be traced who had had jaundice, and his illness occurred three months after he had been bled. Lehane and his colleagues conclude that at least 0.35% of donors are probably carriers of an icterogenic virus. These results all suggest that persons with symptomless infections are the chief danger, and in order to meet demands for plasma a few donors who have had jaundice more than a year ago have been used. In America, the Red Cross Blood Products Subcommittee suggested six months as the safe interval.

It has been recognized for about thirty years that convalescent measles serum may be injected into exposed contacts during the incubation period to prevent or decrease the severity of the attack. Since about 90% of the adult population in most countries have had measles, the modern tendency has been to use the readily available pooled adult plasma. Measles and its complications are responsible for much morbidity and mortality, particularly in children under 3 and in rheumatic, tuberculous, and bronchitic children of all ages. The value of this prophylactic procedure in such children has been proved without question. More recently, Cohn and his colleagues[14] at Boston have produced a gamma globulin fraction which represents about a twenty-five times concentration of serum. This fraction has been used on a large scale in the U.S.A. and is said to be superior prophylactically to adult serum. In addition, serum jaundice is said not to have occurred in the recipients of gamma globulin. Thus, though the age group attacked by measles appears to be relatively insusceptible to serum jaundice, it will be desirable to use gamma globulin instead of adult serum as soon as supplies are generally available in this country. Gamma globulin is expensive to prepare and some of the special equipment necessary is not yet readily obtainable; the production of adequate quantities, even if sufficient serum was available, is therefore no small problem.

The same gamma globulin fraction prepared from pooled adult serum appeared to reduce the attack rate

in adult and child contacts of infective hepatitis in the U.S.A. but was ineffective in serum jaundice. In one experiment the convalescent serum of a patient infected with a known strain of serum jaundice virus failed to neutralize that same virus. Treatment of either infective hepatitis or so-called serum hepatitis has, for the most part, been ineffective. The only treatment that has given any promise whatever has been the intravenous injection of protein hydrolysate. Since we cannot detect these viruses, inactivation is the main safeguard in order to avoid them. The icterogenic agents concerned pass through Seitz filters and are not inactivated by heating at 56°–60° C. for half an hour or by the usual bacteriostatic or bactericidal chemicals used for preserving sera, such as phenol, tricresol, or merthiolate. Recent work has shown that irradiation of serum or plasma with a particular unit of ultra-violet light under satisfactory conditions may be capable of inactivating any icterogenic or other virus present.[15] This procedure is being adopted, as equipment becomes available in the U.S.A., Canada, and England, as a routine treatment for pooled human serum or plasma which is to be used for transfusion or other therapy or prophylactically against certain infectious diseases.

REMUNERATION OF GENERAL PRACTITIONERS

A deputation from the British Medical Association, led by Dr. S. Wand, Chairman of the General Medical Services Committee, discussed with the officers of the Ministry of Health for more than three hours last Friday the evidence presented by the Ministry of what general practitioners in the National Health Service are now supposed to be earning. A further meeting with the Ministry will take place before, it is hoped, the Conference of Local Medical Committees to be held on October 27.

STAPHYLOCOCCAL TOXAEMIA

At Bundaberg in Australia in 1928, 12 children died after an injection of diphtheria prophylactic—a toxin-antitoxin mixture not containing antiseptic. This prophylactic had already been used on three different occasions without abnormal reaction. Three days later 21 children were inoculated, and within five to seven hours 16 became ill with high fever, vomiting, and diarrhoea. In the fatal cases the children developed cyanosis, convulsions, and unconsciousness, and died in 15 to 36 hours. A Commission[1] which was set up to inquire into the circumstances of this disaster reported briefly as follows: that the deaths were due to the injection of the diphtheria prophylactic; that the material contained no free diphtheria toxin; and that it did contain a culture of *Staph. aureus*. A similar staphylococcus was isolated from all the surviving children who developed abscesses at the site of injection. The cause of death was attributed to the toxaemia induced by a copious formation of toxin resulting from the growth of the staphylococcus. The Commission showed that in the conditions prevailing at Bundaberg very little toxin was produced *in vitro*, and so the toxin must have been formed *in vivo*.

In 1930 Kellaway and his colleagues[2] described a pharmacological study of the exotoxin of *Staph. aureus*. They injected agar-extracted toxin intravenously into young cats. After doses of more than 0.1 ml. per kg. the cats died rapidly, while doses of 0.04 ml. per kg. produced diarrhoea and weakness lasting 2–3 hours, followed by recovery. In cats dying in 2½–4 hours the earliest symptoms were dyspnoea, vomiting, and diarrhoea; these developed within 30 minutes and were accompanied by general weakness and ataxia. Later the animals became increasingly weak and collapsed, with convulsive movements; death followed respiratory failure. At post-mortem examination distension of the right side of the heart was observed and an empty left auricle and ventricle. Heart–lung preparations showed that there was constriction of the pulmonary vessels. When the lungs were replaced by an artificial pulmonary circulation it was found that the toxin had a direct toxic action on the heart: this was shown to be due to constriction of the coronary arteries.

Recently Olin and Lithander[3] have reported from Stockholm four cases similar to those at Bundaberg. Three children fell ill after the injection of measles convalescent serum: vomiting, diarrhoea, fever, and cyanosis rapidly developed, and two of the children died. The bottle of serum, which contained quinosol and formalin as antiseptics, had been used eight months previously without ill effect. The fourth case was that of a child on whom a Mantoux test had been performed, 1 mg. of tuberculin having been injected intracutaneously. Within four hours the child became ill, with vomiting, diarrhoea, and fever, and he died in 17 hours. From all four cases coagulase-positive staphylococci were isolated. Tests on rabbits showed a definite correlation between haemolysin titre, necrotic effect on the skin, and killing power. Burnet[4] in 1929 noted the same correlation in the Bundaberg strain, and suggested, in fact, that the three effects were due to one toxin.

In cases such as these, in which the mortality rate is high and the onset of death rapid, early treatment is essential, and the ominous nature of the symptoms should be widely appreciated. Fatal cases have followed diphtheria immunization, injection of measles prophylactic, and Mantoux testing—procedures common in this country. In Sweden one case, that following the Mantoux test, was treated with penicillin, but treatment was begun only within 1½ hours of the child's death. Prompt recognition of these symptoms after an injection would enable penicillin and staphylococcus antitoxin to be given at once. With early treatment there would be some hope of reducing the very high case-mortality rate of a condition which, admittedly rare, might occur in the practice of any doctor.

[1] Kellaway, C. H., MacCallum, P., and Tebbutt, A. H., Report of the Commission to the Governor of the Commonwealth of Australia, 1928. Melbourne.
[2] *J. Path. Bact.*, 1930, **33**, 889.
[3] *Acta path. microbiol. scand.*, 1948, **25**, 152.
[4] *J. Path. Bact.*, 1929, **32**, 717.

REORGANIZATION OF THE MEDICAL SERVICES OF THE ARMED FORCES

BY

E. A. SMYTH, M.B., M.Ch.Orth., F.R.C.S.I.
Major, R.A.M.C.

I apologize for suggesting improvements in medical services that have weathered two great wars with honour, but I do so in the belief that a system of the type I describe might be more suitable in a future war and would make medicine in the armed Forces in peacetime more attractive than at present. I suggest that the medical services of the Royal Navy, Army, and R.A.F. should be preserved, as each Force has its particular problems, but that these services should be relieved of their responsibility for providing permanent hospitals. They would continue to administer preventive medicine but would retain control only of medical inspection rooms, field ambulances, casualty clearing stations, and similar mobile or semi-mobile units.

All permanent hospitals at home and abroad would be taken over by a new service to be known as the "National Health Defence Service." The director-general of this service (a civilian or an ex-Service chief) would be appointed by, and be responsible to, the Minister of Health. Under him would be three deputy director-generals appointed by the director-general of each of the three medical services. These deputies would be either retired officers or those still on the Active List and seconded for this duty.

The hospitals would be situated (1) in "safe" areas near large cities and (2) where there are normally large concentrations of Service men and women. In peacetime they would admit civilian as well as Service patients, but priority similar to that afforded seamen by the Seamen's Hospital Society would be given to Service personnel. In wartime these hospitals would be taken over as required by the Services, and they would accept air-raid casualties from neighbouring towns. The buildings would be constructed cheaply, but with adequate equipment, and would be capable of rapid expansion in time of war for training the staffs of base hospitals at home or overseas. During hostilities the command of base or permanent hospitals within the area of active operations would be handed over to the Service most concerned.

Staffing

National health defence hospitals in the United Kingdom would be staffed as follows :

House Officers.—Regular officers under training and newly qualified civil doctors serving under the same conditions as in civil hospitals.

Registrars and First Assistants.—Regular officers under training as specialists, and civil doctors serving under the same conditions as in civil hospitals.

Specialists.—Regular specialists on the Active List who are not required for the mobile units of the three Services and regular specialists who had elected to transfer to the "Home Only" list (to be described later) after fifteen years' service. There would also be part-time civil specialists.

Consultant Specialists.—Civilian specialists from the nearest centre who would visit their respective departments once a week. On the outbreak of war they would be given full duties as consultants or advisers.

The staffing of these hospitals abroad in peacetime would have to be carried out largely by Regulars.

Conditions of Service

Approximately one or two years after qualification officers would be recruited into one of the three Services as at present. During the first four years each would act as a general duty officer in any part of the world. At the end of this period those who wished to leave the Service, or who were not selected, would receive a gratuity. The others would be granted regular commissions. These officers would enter, partly by selection and partly by choice, one of the following three classes: (1) general and administrative officers ; (2) specialists in preventive medicine ; and (3) specialists in curative medicine. All would receive four to five years' training as follows :

General and Administrative Section.—(1) Three and a half years as house-physicians and house-surgeons in a national health defence hospital, partly abroad and partly at home. The aim of this instruction would be to make the officer a well-trained general practitioner. (2) A twelve-months apprenticeship in preventive medicine abroad. (3) A three-months course in the Service aspect of medical subjects at the corresponding medical college. (4) A six-months course at a naval, military, or Royal Air Force staff college.

Preventive Medicine Section.—(1) A one-and-a-half-years apprenticeship in a national health defence hospital abroad in the specialties related to preventive medicine—i.e., pathology, medicine, dermatology, and venereal disease. (2) A one-year apprenticeship in hygiene abroad. (3) A two-years apprenticeship in civil and Service preventive medicine at home, with facilities for taking a diploma of public health. (4) A three-months general course at a Service medical college. (5) A six-months course at a naval, military, or Royal Air Force staff college.

Curative Medicine Section.—(1) A four-years apprenticeship as a registrar in the officer's chosen specialty at a national defence hospital at home, with facilities for taking a higher degree or diploma. (2) A three-months course at a Service medical college.

Officers from the general and administrative and from the preventive medicine sections would then return for duty with their respective Service. Men and women in the curative medicine section would continue to work in national health defence hospitals at home or abroad, but a few would be required for semi-mobile establishments. Officers in the general and administrative section would gain experience in administrative posts and do clinical work in areas where the employment of specialists would be wasteful. Those in the preventive medicine section would be employed in their specialty or in administrative work.

On completion of fifteen years' service all regular officers could elect to transfer to a list called "Home Only." Posts would be guaranteed. Those who transferred to this list would be employed in the following ways :

General and Administrative Section.—As administrators in the national health defence service or in specially reserved posts in civil practice.

Preventive Medicine Section.—In administrative posts in the national health defence service, and certain posts in the civil health service would be reserved for such officers.

Specialists in Curative Medicine.—In permanent posts in their specialty in a national health defence hospital.

Officers transferred to the "Home Only" list would be able to continue in the national health defence service or a civil health service until the age of 60 or 65. On retirement their years towards pension would be assessed from the date of enlistment with the Services. They would be available for active service on the outbreak of war, and in periods of necessity other than war they could also be called on. This period of recall would not include more than one and a half year's foreign service.

Officers selected for high administrative posts at the end of fifteen years could be offered inducement to continue in the Services as long as required. The nursing services of the armed Forces would be brought into line with the system I have suggested for the doctors.

Advantages

In addition to answering most of the criticisms of the present system these proposals have other advantages. The total cost to the State of all medical services (civil, the suggested new defence service, and the medical services of the Royal Navy, Army, and R.A.F.) should be less than at present. In the first instance Service doctors would be employed in peacetime to full advantage, and would continue to be gainfully employed until the age of 60 or 65. Secondly, the waste caused by separate permanent hospitals for the three Services would disappear. Finally, the employment at small stations of well-trained medical officers of the general and administrative section instead of specialists would be more economical than

the present system, which requires a full complement of specialists in areas where their work is light.

The national health defence hospitals would not be an additional burden of expense to the State, as the number of civilian hospitals needed would be reduced. If war broke out a chain of hospitals capable of rapid expansion would be available in safe areas outside large cities. These national health defence hospitals would be centres of co-operation between Service and civilian doctors and between medical officers of the three Services. This liaison would lead to uniformity of organization, methods of treatment, and types of equipment. Possibly the medical services of the Forces would become merged into one at some future date.

Many civilian and Service doctors believe there is no necessity for Service hospitals in any form in the United Kingdom in peacetime. They consider that all naval, military, and R.A.F. patients could be treated in civil hospitals or if necessary in separate Service wards. This outlook is dangerous. Under such a plan all Service organization would rapidly fall into disuse and on the outbreak of war there would be no effective hospital system capable of rapid expansion to meet the demands of the Services at home or abroad.

My grateful thanks are due to many civilian and Service doctors for their advice, and especially to my commanding officer, Colonel Wm. C. McKinnon, for his willing and helpful criticisms. I am grateful to the Director-General, Army Medical Services, for permission to publish.

STREPTOMYCIN

Available on Prescription

The following notice has been issued by the Ministry of Health.

Scarcity of streptomycin in this country has hitherto imposed a strict control over distribution and limitation of its use to certain conditions. Production has now increased to such an extent as to enable streptomycin to be made generally available on prescription through the usual channels as from November 1, 1949. After November 1 the only administrative controls over this antibiotic which will be operative will be those imposed by the Therapeutic Substances Act, which concern its manufacture, and those under the Penicillin Act, which make its procurement subject to medical prescription.

Hitherto the use of streptomycin in this country has been mostly limited to a controlled study, in an institution, of its effects in certain categories of cases. The extension of these categories has been notified to the profession in press notices issued at intervals during the past two years. Though supplies will be adequate in future for domiciliary use, it is still important that the drug should be employed only in conditions, or to combat infections, in which its efficacy is known. This implies a knowledge of the susceptibility of the infected organism to the antibiotic as well as of the actual condition which it is proposed to treat. Unless this knowledge is possessed before the institution of treatment the reason for any apparent inefficacy of the antibiotic may be difficult to ascertain. An example of the apparently anomalous action of streptomycin is that, whereas it provides the only effective treatment for tuberculous meningitis, it has not been shown to have any specific value in the treatment of chronic pulmonary tuberculosis, both of which conditions are caused by an organism known to be sensitive to the action of the antibiotic. If, therefore, treatment is based on analogy and not on ascertained facts disappointment may be caused both to the practitioner and to the patient. The proper place for the experimental trial of this antibiotic in unusual conditions is the hospital, not the home.

Streptomycin has two main disadvantages. These are: (*a*) certain toxic effects which may be permanent; and (*b*) the evolution during treatment of strains of the infecting organisms which have developed a resistance to streptomycin. It has been thought that the substitution of dihydrostreptomycin for streptomycin itself would reduce the danger of the occurrence of toxic sequelae. The evidence at present suggests that, though the appearance of toxic effects may be somewhat delayed, dihydrostreptomycin may manifest them on its own account. It is therefore most important to employ adequate doses from the beginning of treatment, and in certain conditions it may be preferable to give larger doses than usual for a period not exceeding one week, as serious toxic effects do not appear to develop within that period. In any case, if the expected therapeutic response is not obtained in that time, reconsideration of the treatment is indicated.

No benefit has hitherto been recorded in the prophylactic administration of streptomycin with the object of preventing spread of infection following surgical intervention.

MEDICAL DEFENCE UNION

The annual report of the Medical Defence Union, which was presented to the general meeting of the Union on September 20, gives a synopsis of the many questions having a legal aspect which may confront the practitioner, and mentions some interesting cases in which the perversity of patients, the accident of circumstance, and sometimes the failure of the practitioner to take precautions resulted in difficulties. Of the cases passed to the Union's solicitors during the year, 69 in one form or another involved the issue of professional negligence. Of these 69 cases, 13 were fought out in court, where two were lost and 11 were won. In a further 16 cases it was thought necessary to make *ex gratia* payments in settlement of claims on the clear understanding that no admission of negligence was made; in 39 cases allegations of negligence were expressly withdrawn or abandoned in face of the knowledge of the interest of the Union in the matter and on the issue being formally challenged. Not a few accusations of negligence arise when an account is disputed by the patient.

Requests for Sterilization

It is mentioned that members are from time to time approached by patients with a request for sterilization. Counsel's opinion on this matter was first sought some years ago, but owing to the time which has elapsed since then, and the changes in medical thought and social conscience, it was felt that a new opinion should be taken. The opinion is that sterilization on eugenic grounds alone is illegal, but that it is not so if there are valid therapeutic reasons—in other words, if there are conditions which may imperil health or life if sterilization is not performed. This places sterilization on the same basis as abortion and calls for similar safeguards (including a second opinion and the written consent of the patient) on the part of the practitioner.

The Practitioner and Ancillary Examinations

In his presidential address at the annual meeting Mr. St. J. D. Buxton touched on the question of the responsibility of the practitioner concerning ancillary examinations. He pointed out that the patient knew little or nothing about the work of specialists, and if a practitioner acted on an *x*-ray, pathological, or other report which happened to be erroneous, though given in good faith, he might be charged with negligence, with the other doctor as co-defendant. Hence it was of the utmost importance that consultation with those carrying out ancillary examinations should be made, at least whenever there was doubt, for the sake of both patient and doctor.

He also mentioned that members frequently ask advice regarding inquests, and during the year legal representation had been afforded in 20 instances. Practitioners were sometimes accused during inquest proceedings of negligence in the treatment of the deceased, but such allegations had been successfully refuted. Action had also been taken by the Union to ensure that practitioners received their statutory fees for evidence of medical fact or opinion given at inquests.

Mr. Buxton intimated his desire, having been re-elected president for several years, to give place to another member. After placing on record its sense of the value of Mr. Buxton's exceptional services, the meeting proceeded to elect as the new president of the Union Mr. Ivor Black, F.R.C.S.

In view of the upward trend of all costs, the meeting agreed to a recommendation of council to increase the subscription rate from January 1, 1950, to £2 per annum except for the first

three years of membership of those elected within three years of registration, for whom the subscription would remain at £1. It was explained that during the last two years the total expenditure had exceeded the income from all sources by £20,000. Last year the subscription income was over £30,000, and the law expenses and indemnity claims alone cost over £35,000. It appeared to the council improvident to continue to deplete the Union's invested funds.

TREATMENT OF CEREBRAL PALSY

DR. EARL CARLSON'S ADDRESS

A meeting of the British Council for the Welfare of Spastics was held at the Royal Society of Medicine on September 21 for an address by Dr. EARL R. CARLSON, of Philadelphia Hospital, New York, on the treatment of cerebral palsy. The chair was taken by Professor Alan Moncrieff.

Dr. Earl Carlson said that cerebral palsy was a disturbance of musculature almost as prevalent as poliomyelitis. In most cases the cause was injury to the brain during birth or the faulty development of brain cells; occasional causes were toxic factors, encephalitis or meningitis, and, in certain conditions, disturbances of the Rh blood factor. In cases with choreoathetosis and spasticity there had always been dispute about the location of the cerebral lesions, and especially whether the disturbances in muscular movements resulted from damage to the basal ganglia. There was a group of patients with choreoathetosis and various degrees of spasticity whose response in certain situations, and to treatment, was such as to make one hesitate to place the lesion chiefly in the basal ganglia; in these cases one might well speculate upon damage to the motor or sensory cortex.

The treatment of cerebral palsy was an educational as well as a medical problem. The tremors, writhing motions, and grimaces were so intimately tied up with the thought processes that it was difficult to regard these movements as something apart from feelings. Excitement and lack of concentration aggravated the condition; with tranquillity and peace of mind the motor activity became much more purposeful. Cases of cerebral palsy suffered not only from unruly muscles but also from disorganized thoughts and emotions. The extent of mental disability bore no relation to the amount of motor handicap. A child with serious motor involvement might have better intelligence than one with a slight physical impediment.

The majority of speech disturbances formed part of the general motor disturbance. Here again the extent of the speech defect bore no relationship to the degree of mental impairment. In one group a child with the lowest intelligence quotient was one of the best speakers and singers. The outstanding characteristics of the defective speech were lack of smooth rhythm, poor articulation, absence of subtle shadings and nuances, and an accompaniment of inappropriate contortions. Speech was an intricate muscular process, and its disturbance was so closely linked with the general spastic-athetoid condition that not much improvement could be hoped for until the child learned to inhibit the excessive sensory stimuli which were irrelevant to what he was doing. He resembled a public speaker trying to overcome stage fright. If he was too conscious of his audience he would have difficulty, but when he directed his thoughts to the topic of his address his delivery improved. Similarly the child who could forget himself and concentrate on what he was saying had less difficulty in speech.

Physiotherapy, Surgery, and Drugs

Physiotherapy must be adapted to the individual case and related to the clinical findings. In spastic conditions there was usually a powerful simultaneous contraction of both extensors and flexors, and the limb became rigid. Treatment was directed to overcoming this condition by teaching the spastic child to relax one set of muscles as the opposing muscle group was brought into action. The child with the scissors gait, for example, was taught to spread his legs apart after he had relaxed the muscles that kept them crossed. In treating athetoid conditions relaxation was of primary importance. Training should be directed towards keeping the patient occupied and at the same time to "keeping his mind off his muscles." This could be done by directing his attention to the purpose of the act rather than to the muscles which performed it. Occupational therapy was a valuable adjunct in treating all types of cerebral palsy. Water treatment was often conducive to relaxation, but was not as effective as in poliomyelitis.

Visual training was important. The child with cerebral palsy had difficulty in correlating muscular activity and perception. He tried to look in too many directions at once, and when there was difficulty in correlation muscular tension developed. The origin of many "fears" might be traced not to an unpleasant experience and its associations but to a muscular tension which developed because of lack of integration between perception and motor activity.

The physiotherapist who treated spastics should be a person with a temperament and personality conducive to relaxation. The exercises should be slow, co-ordinated, rhythmic movements, beginning with the major groups of muscles. In younger children it was often necessary to assist them passively until they were able to carry out the movements by themselves.

Surgery often helped a programme of muscle training; it was more effective in spastic than in athetoid conditions. Lengthening tendons, arthrodesis, tendon transplantation, obturator neurectomy, and neurectomy of the nerves to the gastrocnemius muscle were sometimes helpful, but must be followed by a course of exercises. On the whole, little was accomplished for the athetoid case by peripheral operations on nerves and muscles. Posterior root section and operations of the Stoeffel type were contraindicated, and stabilization of the ankle or tenotomy of the Achilles tendon when much athetosis was present was seldom helpful. In severe cases of athetosis involving one arm, resection of the anterior portion of the corresponding motor cortex had been successful in some cases. Section of the extrapyramidal pathways in the spine had yielded favourable results in some of the most distressing cases of athetosis. The use of braces and splints was more helpful in spastic conditions; in athetosis, except in mild cases, they usually aggravated the condition.

Drug therapy had not been as effective as popular literature led them to believe. Sedatives should not be used except in convulsive disorders, and then only to diminish the attacks without giving rise to drowsiness. Any drug which tended to depress mental activity made the patient less responsive to treatment. A cup of coffee would often do more than a sedative. Alcohol in many cases had some effect in controlling athetosis and spasticity. In a film which Dr. Carlson showed subsequently a patient who had been unable to bring a full glass of water to her lips without spilling the contents had no difficulty whatever after consuming 2 oz. (60 ml.) of whisky.

Education and Vocation

The mental growth brought about through education was the most important factor in amelioration. When a cerebral palsied child was placed in a school and became occupied, an improvement in muscular control was often seen without special emphasis being placed on muscle training itself. Parents who delayed academic training until the child acquired better control of his hands or speech were surprised at the rapid improvement in muscle control which followed when the child was finally allowed to go to school.

Every educable cerebral palsied person should have the right to an education irrespective of the extent of the affliction. Special schools should be provided for those too seriously handicapped to fit in a normal school environment. The schools should be equipped to give physical and occupational therapy, speech training, and other remedial activities.

All the cerebral palsied, of course, could not benefit to the same degree from an educational programme. The severely and hopelessly handicapped must no doubt be admitted to institutions, though they should not be treated as idiots. Others whose physical handicap was less severe, although their mentality prevented them from benefiting from education above the lower grades, must be guided into routine occupations. Those

who had good intelligence should not be barred from obtaining as much educational training as they could benefit from, even though their physical handicaps were of such a nature as to close many vocational avenues.

The solution of the vocational problem was dependent upon many factors. One of the most important was the patient's attitude to his own handicap. He must be prevented from developing a morbid attitude. There was almost always a way of circumventing the handicap. Dr. Carlson mentioned one or two cases of surprising achievement. One girl had won a college degree and made a career for herself as a teacher of the blind, thus freeing herself from the sense of being an object of curiosity to her pupils. One severely handicapped man, whose speech was then wholly unintelligible, had formerly earned his living in New York by selling newspapers, but he had educated himself, taken the degrees of M.A. and Ph.D., and was now teaching in a school for the cerebral palsied.

Mr. M. D. BOSWORTH SMITH said that Dr. Carlson himself was the most noteworthy living example of triumph over handicap as the result of will power and concentration, intellectual and moral. He added that it was believed there were 10,000 children under the age of 16 in this country suffering from cerebral palsy of various types. It was the aim of the British Council for the Welfare of Spastics to do what it could to encourage proper treatment by the establishment of special schools and clinics and the organization of research, but only the fringe of a vast subject had so far been touched in this country.

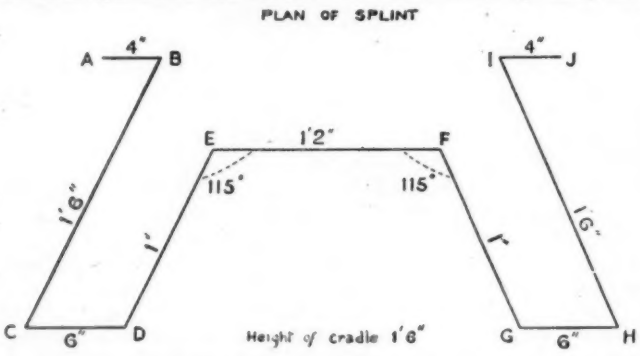
Professor ALAN MONCRIEFF said that on his computation, on the basis of American experience, the number of children afflicted in England and Wales should be 28,000, not 10,000 as Mr. Bosworth Smith had suggested. If the latter figure was right, we had for once the advantage of being on the right side of the account so far as America was concerned.

Preparations and Appliances

ANTI-EXTERNAL ROTATION ABDUCTION SPLINT AND BED CRADLE

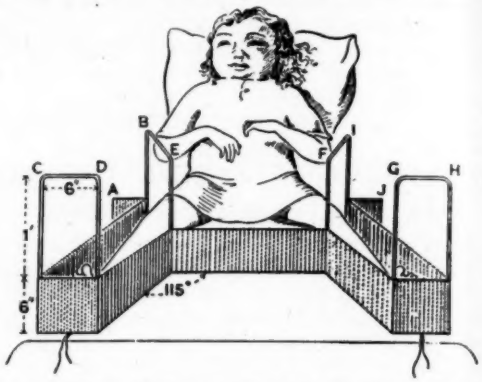
Mr. E. K. McLEAN, Medical Superintendent, Southlands Hospital, Shoreham, writes: After the insertion of a Smith-Petersen pin for fractures of the femoral neck maintenance of the correct position in the patient is of great importance. External rotation of the thigh may lever the pin out of position, as may forcible adduction of the thighs. Flexion and extension movements of hip-, knee-, and ankle-joints are, however, to be encouraged. The problem is often met by making the patient wear slippers with wooden supports glued to the soles. These appliances, however, limit movements, are uncomfortable, and may produce pressure sores unless carefully supervised.

The splint described below has been used very successfully at Southlands Hospital as a combined abduction anti-external rotation splint and bed cradle. It can be made up easily and



cheaply by the hospital engineers, as it is of very simple construction.

The instrument works on the same principle as the old-fashioned "stocks," but instead of the feet being fixed in apertures each leg lies in a padded gutter (cf. B,C,D,E and F,G,H,I). The framework of the gutters is made of 5/16-in. (0.8-cm.) bright mild steel rod. The walls of the gutters are covered with pillow ticking and padding of tow and cotton-



wool covered with old linen. The height of the walls is 6 in. (15 cm.) and the width of the gutters 6 in. Loops of steel rod join B to E, C to D, F to I, and G to H. These loops project upwards from the gutters for one foot so that the instrument may be used as a bed cradle. The two gutters are joined by a flat padded continuation of the medial gutter walls (E,F). There are also laterally reflected 4-in. (10-cm.) phalanges at A,B and I,J. These transverse phalanges and connecting wall prevent the patient from pulling a leg out of the gutter and thrusting it back on one or other side. The instrument does not prevent flexion and extension of hips, knees, and ankles. It does, however, prevent adduction or external rotation of the thighs.

At first it was found difficult to keep the padding on the splint clean. This difficulty is obviated by covering the splint with domette bandages. These should be wound so that the overlapping edges are away from the patient, as this prevents fraying.

The patient's comfort is increased by placing in each gutter a soft pillow made from a length of 6-in.-wide plaster stockinet lined with a strip of cotton-wool ¼ in. (1.25 cm.) thick. A pillow of body-width plaster stockinet and cotton-wool about 2 in. (5 cm.) thick placed across the bed under the patient's knees prevents their hyperextension. Tapes are attached to the splint base at A, C, H, and J, so that the instrument can be tethered to the end and sides of the patient's bed. The employment of this splint has improved the percentage of recoveries in good position.

I have to thank Miss K. C. Savin, the charge physiotherapist, Mr. T. E. G. Sayer, chief hospital engineer, and Mr. H. Gander, assistant engineer, for much valuable help.

A cine-micrographic film library has been established by the Royal Microscopical Society for scientific films within the range of the society's activities. Hitherto many excellent films made in academic research institutions have not been accessible for educational purposes. It is hoped that the existence of this new library will facilitate distribution to universities, technical schools, and other scientific bodies. The collection is at present not very large, but it may claim to be representative. It contains films from the Pasteur Institute, Paris, by J. Comandon and de Fonbrune, on mitosis in *Triton* erythroblasts and in *Acanthamoeba*; films on micromanipulation; on spermatogenesis in the grasshopper, by K. Michel, of Jena; on the shape and motility of bacteria, by A. Pijper; and also films on the cultivation of living tissues, by R. G. Canti and his collaborators, and on tissue-cultures under the phase-contrast microscope. These films are available for hire on application to the Assistant Secretary, Royal Microscopical Society, B.M.A. House, Tavistock Square, London, W.C.1. The fees charged are 7s. 6d. for each 400-ft. reel when it is returned on the day following use: 1s. in addition for each subsequent day that the films are retained. The basic charge is reduced to 6s. for Fellows of the Royal Microscopical Society.

Correspondence

The M.R.C.P.

Sir,—The Royal College of Physicians has accepted the report of the committee on the examination for the M.R.C.P., and this has now been open to criticisms. May I make some observations on the report and the criticisms?

The committee upholds the view that the examination should be "a test in general medicine, on a level higher than that required for qualification." That is to say, the subject matter is not materially different, but the standard is definitely higher. The committee returns to this later with the statement, "The examination is in general medicine. . . . The examiners are not entitled to condemn a candidate for lacking recondite knowledge." This is and always has been the accepted tradition of the College. Examiners are not bound by any regulations and may pursue for a reasonable distance paths leading outside these boundaries and occasionally may wander too far. But substantially a candidate stands or falls on his knowledge of the foundations of medicine and on his skill and experience, indeed one may say his common sense in applying these to the clinical examination of a patient.

Teachers have been known to advise candidates for the M.R.C.P. to cram up rare diseases, to memorize ephemeral theories, and to mug up articles in current numbers of the medical journals. No worse or more incorrect advice could be given. If followed, as undoubtedly happens, it fully justifies Professor J. McMichael's statement that study for examinations cramps and harasses excellent young men. But this is not and never has been the intention of the College or the standpoint of the examiners. The unfortunate candidate who follows this advice is riding for a fall. Properly conducted, "working for the membership" is extremely good training and calls for no detailed knowledge of specialized subjects. Even those who fail should have benefited by the experience. As the committee says, "The educational value of the clinical examination is far from negligible."

I pass to another matter. The report refers to differences of opinion about the purpose of the M.R.C.P. "On the one hand, membership of the College is widely regarded as the hallmark of the specialist, and the examination is looked on as a final test. . . . On the other hand, teaching hospitals more and more demand membership as a qualification for the post of registrar . . . and candidates are thus encouraged to take it early. No examination can fulfil two such different functions."

Now the M.R.C.P. has fulfilled both these functions satisfactorily—viz., as a guide for the appointment of a registrar and as a guide for the appointment of a hospital physician, but there is a difference in the manner and degree in which it does so. The applicant for a registrarship will probably have been qualified about three years and will have taken the M.R.C.P. some three or six months previously. Nobody expects him to be a finished physician. The electing body will view the M.R.C.P. exactly in the words of the committee's report—viz., that it signifies a "knowledge of general medicine which justifies further training as a consultant." The successful candidate then settles down to learn his trade. Some years later he applies for an appointment as hospital physician, for which the M.R.C.P. is essential. Applicants will not be expected to have passed the examination three or six months previously. Indeed a candidate who had only done so recently would be questioned closely as to why he had not taken it before: on the contrary he will be expected to have taken it when our registrar did so. Having satisfied itself that the candidate passed the M.R.C.P. at the proper time, the electing body then scrutinizes his record during the intervening years to decide whether or not he has fulfilled his early promise and can be accepted as a trained physician, either in general medicine or in some specialty. It is therefore not correct to say that "the examination is looked on as a *final* test" of a specialist: "initial" would be more accurate.

Here then is the answer or one answer to the question, Who is to decide at the end of such training that the possessor of the M.R.C.P. is or is not a failed specialist? The method does not always work fairly, but how many prospective hospital physicians would prefer the risk and anxiety of an examination at this stage, even if it led to a somewhat cheapened F.R.C.P.? Nor would it eliminate the inquiries of an electing board.

One more point. It has been suggested that the M.R.C.P. should scrap its present traditions and become an examination in special subjects. There is no cause for making any complete reconstruction of the examination either in this or other directions. The last paragraph of the committee's report states that it recognizes that "its proposals are for functional rather than structural change." It is right that this should be so. For the difficulties of the M.R.C.P. are due not to its failure but to its widespread success and sustained reputation. Nor is there any reason to believe that the present internal changes in the examination will lead to any alteration in its status.—I am, etc.,

London, W.1. Henry Tidy.

Trends in Medical Education

Sir,—If the object of medical education were to train medical scientists and technicians, the plans for the reform of medical education outlined in the papers printed in the *British Medical Journal* of September 10 might produce good results. They will not produce good medical practitioners.

I have selected three points for comment. First, Professor Arnott's definition of medicine; second, his implication that the non-physical aspects of medicine are superstition and empiricism; and lastly his supposition that the scientific method is incapable of being applied to the art of medicine, the effective existence of which he denies. I have read his paper carefully, and hope I have not misunderstood him.

Is medicine an art? No one denies that it is, in part, a science. Quoting the *Concise Oxford Dictionary*, Professor Arnott defines medicine as a science and "an art only in so far as the term means human skill." On this assumption he outlines proposals for training scientific craftsmen. But is the art of medicine only a "craft"? One of the alternative definitions of an art given in the *C.O.D.* states that a fine art is one "in which mind and imagination are chiefly concerned." Surely the correct description of medicine is first a fine art, secondly a science, and thirdly a craft.

Abolishing "mind and imagination" from medicine (thence from medical education) necessarily means that we abolish individual and social psychology, and much else besides these, from medical education. Or perhaps it means admitting them as a concession to "superstition and empiricism," those persistent vulgar fractions that mar the mathematic exactitude of the pure sciences. The writer of your leading article deals neatly and with subtle humour with this travesty of medicine when he writes, "Though psychology has made but a shy appearance in these articles, it lurks in every corner." "Shy" is certainly the operative word in that sentence. Meanwhile psychology does not lurk in the corner of doctors' surgeries, but occupies more than 50% of their working time. Doctors do not have to deal with the "prevailing emotional pattern of man," but with persons who (it seems to me) will be extremely likely to be overlooked in this reformed medical education.

Lastly, Dr. Arnott implies that scientific method cannot be applied to the study of that part of medicine that is not science but superstition or empiricism. Hence I presume scientific method is inapplicable to clinical medicine, which is necessarily largely empirical. I should have supposed that the scientific method could be applied as conscientiously—if not as rigorously—to the art of medicine as to its science. Surely the difference lies not in method but in the relative proportions of measurable fact on the one hand and of clinical acumen (or insight) on the other. I affirm that the art of medicine can be practised scientifically every bit as successfully as its science can be practised artistically.

I hope these new proposals for the reform of medical education will be closely scrutinized. Doctors are not yet medical technicians nor scientific craftsmen, but they soon will be.—I am, etc.,

Lark Hill, Worcs. Howard E. Collier.

Hypnosis in Treatment

Sir,—Your correspondent Dr. K. M. Hay (September 17, p. 653) has expressed some misgivings about the therapeutic dangers of hypnosis on the basis of the theory described in his letter. I hasten to reply that those of us who employ hypnotherapy are not fully agreed that the dissociation theory can explain adequately the true nature of hypnosis. Dissociation does occur during hypnosis and is often facilitated by it, but this does not logically imply that hypnosis is merely a form of dissociation. For example, the variability and autonomy of the so-called dissociated symptoms seen during hypnosis cannot be accounted for by this theory any more than can the active and purposive participation of such symptoms in the total behaviour of the subject.

Changes in personality, as demonstrated by the Rorschach test, have been reported by various investigators. T. R. Sarbin (*Amer. J. Orthopsychiat.*, 1939, **9**, 315) stated that there was an increase of "organizing energy" and the externally imposed *Aufgaben* circumscribed the response pattern to a greater extent than the self-imposed *Aufgaben*. Other personality changes have been reported when different moods have been produced under hypnosis, when anxiety is made to develop, or the subject is regressed. Such phenomena are not, as is suggested by Dr. Hay, indicative of a weakened personality but are merely changes of personality whilst in the hypnotic state. No evidence exists to suggest that these changes tend to become permanent.

Dr. Hay's conception of hypnosis as a mental assault by the hypnotist upon the subject is a false one cultivated by stage performers and charlatans. The true role of the operator in hypnotherapy is rather to introduce and guide the subject through the hypnotic experience, when the method becomes a truly valuable aid to the diagnosis and cure of mental illness.—I am, etc.,

London, W.14. Neville Murray.

Sir,—Dr. K. M. Hay (September 17, p. 653) in discussing hypnosis as a form of treatment states that a hypnotized person is "depersonalized," that his intellectual faculties are suppressed, and then his mind is influenced on the feeling level by the hypnotist. In other words, the hypnotic subject is a passive automaton blindly responsive to the suggestions of the hypnotist. The hypnotized subject, as any medical man who practises this science will tell you, is by no means an automaton; a suggestion takes effect only if it is consistent with the balance of forces of the individual's strivings, and his understanding and elaboration of a suggestion are likewise determined by his own personality structure. The suggestion is really autosuggestion, just as there is no education but autoeducation, since it does not matter how much an individual is taught if he does not learn anything.

About a year ago I saw a girl with a cardiospasm that she had had for four years. The history revealed that it dated from the day her mother died. Under hypnosis she was told that she could not swallow the fact . . . that her mother died—that the mere thought of it stuck in her throat. It was through her intellectual faculties that understanding came and through the hypnotic power of suggestion that she was able to swallow.—I am, etc.,

London, W.1. A. P. Magonet.

Distinction Awards

Sir,—Would any advantage be gained if we were to take a hand and grade administrators, superintendents, and the like? The waste of medical man-power might be reduced in this way. Although an advantage, it is not always essential for a superintendent to be a medical man. From time to time I have worked under three unqualified men who managed to unify the various requirements of the different hospital committees economically and with satisfaction to all concerned. One sees medical men in their prime superintending and inspecting hospitals, planning, etc., when they could be better employed working at medicine or surgery, in which subjects they have long been trained. The extra cost to the country must be considerable. Administrative work could well be left to older members. From long experience of the manner of it they might be glad to have a less strenuous and more regular and complacent mode of life during their declining years than they had when practising their profession.—I am, etc.,

London, W.1. G. H. Colt.

A New Neonatal Syndrome

Sir,—It was with much interest that we read the article of Mr. W. G. Mills on a new neonatal syndrome (August 27, p. 464), and we would like to record the following case seen recently and which appears to be identical with the eight cases in his article:

Male child, born June 9, 1949, by caesarean section on account of placenta praevia. At birth there was some respiratory distress, and nikethamide was injected into the umbilical cord.

On June 10 "bruising" of the left buttock and perineum was noticed.

On June 13, on the left buttock there was a network of small superficial vessels and some large deep ones. The movements of the left leg were weak, and there was slight oedema of the left foot, which was not being moved spontaneously.

On June 17 the condition of the buttock was subsiding, and it appeared as if thrombosis was taking place. There was still considerable weakness of extension of the left knee and dorsiflexion of the ankle. The general condition was always excellent, and the buttock became normal. At the time of writing the left leg is much improved following orthopaedic treatment in a plaster.

The condition of the buttock was almost identical in size and shape with that shown in Mr. Mills's photograph.

There was in this case the common factor of an umbilical cord injection, and it appears to us that the postulation of intra-arterial injection of a drug leading to thrombosis is the probable aetiological factor. A puzzling feature of the condition is that it has only recently been described although many thousands of injections into the cord must have been given, with the risk of intra-arterial injection. It would be interesting to know if the condition has occurred with lobeline alone. If nikethamide is the only drug concerned, has its chemical formula been changed recently?—We are, etc.,

Crystal Bates.
Nottingham. A. P. M. Page.

Transfusion in Domiciliary Midwifery

Sir,—I have read with interest the controversy arising out of the letter of Dr. C. T. H. Whiteside (June 4, p. 1005) on the use of dried plasma in retained placenta. The following questions arise: (1) What is the maximum time during which a placenta may be left in the womb? (2) In a case of retained placenta with profound shock, what would be the ideal procedure to adopt—remove the placenta and then treat the patient for shock, or the reverse? (3) Which is the ideal fluid for intravenous transfusion in such cases—whole blood, blood plasma, gelatin solution, or saline with glucose? (4) What is the best anaesthetic to use for removing an adherent placenta?

I am in agreement with the opening sentence of Dr. H. A. Logan's letter (July 23, p. 232) that "in these days of synthetic medicine, diplomas, etc., it is refreshing to read some of the facts of life as expressed by those capable of using their powers of observation and confirming them with experience." Having done 22 years of midwifery as domiciliary practice, and not possessing anything better to transfuse than normal saline with glucose for an emergency, my working procedure in cases of retained placenta has been as follows. If I am on the spot when the second stage of labour is over and the placenta does not deliver itself in one hour, I remove it under soluble thiopentone. If, however, the retention is attended with more bleeding than I feel happy about, the period of waiting is less, depending on the amount of blood lost and the contractility of the uterus.

The difficult problem is the woman about whom a call is sent after the placenta has failed to deliver, and who is therefore seen in varying degrees of shock or collapse. I can look back on eight such

cases, the last of which proved fatal. She was a third para in normal health, despite so much malaria in this Protectorate. As a primipara her confinement took place in a normal way in my surgery. The second labour was so uneventful that no help was taken. Her third delivery was at 1 p.m. on July 17, 1949. At 3.45 p.m. the placenta had not delivered, though the attending African qualified midwife had made some attempts to deliver it. I was therefore sent for, and, the place being 20 miles (32 km.) away, I reached there at 5 p.m. No pulse could be felt at the wrist. She was restless, fully conscious, and extremely anxious about herself. She had been in labour for the best part of three days; and "after much suffering" she had brought forth the baby. Much blood had been lost, but her condition was one of "obstetric shock" from retained placenta and attempts made for its removal. The uterus was alternately contracting and relaxing. The following injections were given: (1) intravenous ergometrine; (2) adrenal cortex; (3) later, coramine; (4) intravenous saline with glucose, 1 pint (570 ml.).

At 5.30 p.m. the pulse could be counted at the wrist, and the uterus was well contracted. At 5.50 the uterus began to relax and bleeding started once again. At 6 the pulse was flickering. A quick decision had to be made. With a minimum of ether given by the open method by the assistant I used a half-elbow-length rubber glove and delivered the placenta. The placenta had been firmly adherent in one part of it; and it was some satisfaction to know that it would never have delivered itself. When I withdrew the hand there was hardly a pulse at the wrist. At 6.30 the lady died.

In a paper read at a medical conference held in Nairobi in February, 1949, on domiciliary midwifery practice in Uganda I made the following three important points about a retained placenta: (1) Credé's method, as taught, learnt, and practised in many places is attended with much danger; (2) it is wise to restore the shocked condition of the patient before doing manual removal; and (3) wiser still to use an anaesthetic for manual removal.

I wish to make another point. Those urgent cases in which manual removal without an anaesthetic is done, and succeeds without killing the patient, are the ones in which atonic retention of the afterbirth with a smart haemorrhage is the predominant factor. There has been no time in such cases for shock to supervene, for the simple reason that before this event happened the woman died of haemorrhage, or some bold person timely extracted the placenta without anaesthetic and saved a life. In one of my cases a lay, elderly woman did this heroic act before my arrival; I am not sure if she had washed her hands for the operation. The patient lived.—I am, etc.,

Iganga, Uganda. P. S. Sanade.

Poliomyelitis

Sir,—Now that it is the poliomyelitis season in this country I thought it would be of interest to describe my experiences in Ceylon during June, July, and August last year.

I was the medical officer to R.A.F. station, Negombo, which contained a total European population of about 750, including families. The station was 20 miles (32 km.) from Colombo and situated in a coconut plantation.

During this period several cases of paralytic poliomyelitis were admitted to B.M.H. Colombo from Army units in and around Colombo. Colombo was put out of bounds to our personnel, except on important duty.

At Negombo I saw a high proportion of cases of pyrexia in the younger Service personnel and children at this time. The clinical picture was as follows. The patient complained of headache, backache, slight diarrhoea, and a general feeling of weakness. The headache was severe, but not unbearable as in typhoid, and the weakness more than would be expected for the temperature, which was not usually high in spite of the climate. On examination, the physical signs were not convincing. Nystagmus was not found, but a doubtful neck rigidity was common. Most cases showed photophobia.

All patients were kept under observation in bed and not allowed up until their pyrexia had settled for at least 48 hours, provided that they were also symptom-free.

As far as I can remember I sent at least three refractory patients to B.M.H. Colombo, all of whom had a raised protein in the C.S.F. and all of whom settled eventually without paralyses.

Unfortunately, I myself developed headache, backache, and slight diarrhoea, and it was natural to conclude that it was psychological in origin; however, I retired to bed and stayed there. The feeling of weakness was most marked, especially in the legs, and somehow my mind seemed dull; but interest in poliomyelitis was sufficient for me to go right through the numbers of the *British Medical Journal* covering the 1947 epidemic in England. About five nights after the onset I woke up with the most terrific pain I have ever experienced, in my left shoulder. It was impossible to localize it exactly, and I could not relieve it by movement or position. It was so bad that I resorted to walking about the room, although I knew it was wrong. Morphine ¼ gr. (16 mg.) had no effect, and I slept after a further half grain. The next morning the pain had gone, except when I moved the shoulder. It took about ten days to regain full painless movement, and about a month later my supraspinatus and infraspinatus had wasted completely on the left side. There has been no recovery in these muscles, and apart from slight weakness I do not notice any limitation of function.

This letter has been written from memory, and the lack of detail is regretted, but it is felt that the majority of my cases were non-paralytic poliomyelitis.

The measures taken to restrict the disease were simply to tighten up on camp hygiene and especially fly control. Where there was a case in a family the parents were asked to restrict mixing with other families, but few parents were told the possible nature of the disease. It was felt that the disease was obviously so widespread that rest and observation of all fevers were more important than rigorous restrictive measures which would only cause unnecessary panic.—I am, etc.,

Ashford, Middlesex. N. G. Nicholson.

Poliomyelitis Vaccination

Sir,—As a mere medical student I hesitate to write this letter, and hope that in doing so I am not simply revealing a lack of fundamental knowledge.

I am at a loss to understand why the lead given not so long ago by Jenner and Pasteur in the modification or attenuation of a virus, so that it may be used for vaccination purposes, has not been followed in the case of other virus diseases, notably poliomyelitis. Surely did not Pasteur attenuate the rabies virus by drying the cord of animals suffering from the disease, having first elevated the virulence to the maximum possible level, and by injecting such dried cords of gradually increasing virulence so produce immunity? Could not a similar process be utilized in producing poliomyelitis immunity, which if successful, and if employed on the scale now used against smallpox, would remove this scourge from our midst?—I am, etc.,

Hatch End, Middlesex. M. H. F. Johnson.

Gravitational Ulcers of the Leg

Sir,—The recent correspondence following Dr. S. T. Anning's valuable article (August 27, p. 458) prompts me to mention one point in connexion with chronic or recurrent gravitational ulcers which has received little attention. It is that these patients commonly have a partial ankylosis of the ankle-joint, particularly if the ulcers are in the region of the ankle. This occurs so frequently that it is uncommon to find a full range of movement of the joint in patients who have such an ulcer of any chronicity. The ankylosis probably results from a number of factors. The ankle may be held rigid to avoid pain in the acute stages, or sometimes a patient is kept in bed for long periods with the leg held relatively immobile. The chronic oedema may play a part, and finally the wearing of paste bandages immobilizes the ankle-joint, often for many months.

The main cause of gravitational ulcers is generally suggested to be the devitalization of the skin by the chronic venous insufficiency and subsequent oedema. Ankylosis of the ankle obviously impairs the circulation, and the aid to venous return from muscular contraction is diminished. It is therefore apparent that such an ankylosis will augment the essential conditions responsible for the ulceration.

In many cases this ankylosis can be avoided by suitable foot and ankle exercises, preferably taught, and in some cases supervised, by a physiotherapist. Obviously, common sense is required in avoiding friction of the ulcer against bandages, etc., and in the initial stages the exercises should not be vigorous. With patients lying in bed regular exercises may also play a part in improving the circulation, and so accelerate healing. Paste and supportive bandages have a very important place in the treatment of gravitational ulcers and are used extensively. However, it must be weighed against the undoubted value of these measures that a degree of ankylosis with its attendant disadvantages will be more likely to occur following their prolonged use.—I am, etc.,

Bristol, 8. ROBERT P. WARIN.

Essential Hypertension in Pregnancy

SIR,—Professor J. Trueta's misrepresentation of my view (September 17, p. 650) is due either to a misapprehension or to other causes. He attributes to me the opinion that anuria "is not the result of a decreased intrarenal blood flow, but on the contrary that it is due to an increased blood flow to the renal medulla, which maintains the 'obstruction' of the uriniferous tubules"—as though I supposed an increased blood flow to and through the medulla is primary. Had Professor Trueta read my paper on eclampsia and its lesion (*J. Obstet. Gynaec. Brit. Emp.*, 1929, **36**, 341)—not mentioned in the 16 pages of the bibliography of his book—he would have found that I hold a very different picture.—I am, etc.,

Rugby. R. H. PARAMORE.

Parturition after Pneumonectomy

SIR,—As we cannot find in the literature any other case of a woman going to full term and parturition after a total pneumonectomy, we thought that it may be worth while to have the following case on record.

The patient is a 23-year-old primipara in good general condition (weight 8 st. 2 lb.—51.3 kg.). In 1942 Mr. T. Holmes Sellors performed a left pneumonectomy for gross bronchiectasis. In August, 1948, the patient became pregnant, and apart from slight oedema of the feet at the end of the day the pregnancy was uneventful. She went into labour in the early hours of May 3, 1949; the cervix was fully dilated by the evening of the 5th, but, as the patient was unable to push, medical aid was sought. She was delivered under chloroform anaesthesia by a high forceps manœuvre, preceded by an episiotomy. The episiotomy was repaired immediately after delivery. The child, a male weighing 6 lb. 3 oz. (2.8 kg.), was very shocked at first but recovered quickly on clearing the air passages.

—We are, etc.,

F. KELLERMAN.
R. SAUVAN SMITH.

Colchester.

Memorial to Charles John Bond

SIR,—In the letter from Dr. Joan B. Walker and Mr. N. I. Spriggs (September 17, p. 655) referring to the fund which is being raised in Leicester to provide a memorial to the late Mr. C. J. Bond no reference is made to what was undoubtedly one of his great interests in the later years of his life—the question of voluntary euthanasia. He took a leading part in the formation of the Voluntary Euthanasia Legalization Society, and was the first chairman of its executive committee, a position he held until his death. It was at his personal invitation that the late Lord Moynihan became the first president of the new society, and doubtless it was largely due to the great prestige attaching to Bond's and Moynihan's names that the society made the rapid progress it did in securing the adherence and support of so many other distinguished members of the medical profession.

No review of Bond's life and work would be complete which did not include a reference to this aspect, and it is possible that in the years to come the great part he played in the initiation of this reform will be what he will be chiefly remembered and honoured for.—I am, etc.,

Leicester. C. KILLICK MILLARD,
Honorary Secretary,
Voluntary Euthanasia Legalization Society.

Old Age

SIR,—With increase in the numbers of those who have grown old, there arises the question, Can anything be done about it? If the majority of these had grown wiser, and kinder, and less selfish, one would not mind so much. But so many apparently live only for themselves. Daughters, and even sons, are kept at home to minister to the old people's wants, and these offspring are often prevented from marrying. I wonder, do they ever ask themselves, "What use am I in the world?"

The resources of the public, or private persons, have often to be expended on them; they take up the time and labour of many; they consume food, and occupy space that is badly needed for the younger. Why encumber they the ground? Segregation may be one remedy, or, more brutally, they might be induced to agree to voluntary euthanasia. But I doubt—even if it were allowed—that many would agree to this. What, Sir, is your suggestion?—I am, etc.,

Portsmouth. J. RUSHWORTH LUND.

Syringes

SIR,—I regret that my letter on the advantages of the Luer syringe fitting (August 13, p. 387) has led to a little misunderstanding. The type of fitting which I have found so useful in ophthalmic surgery (as it enables the injection to be made with one hand whilst withdrawing the needle, and without any risk of leakage) is the Luer-Lok fitting. After correspondence, I find that this is not yet available in this country, though it may become available in the next year or so. I hope that the production of this type of bayonet-joint fitting for hypodermic syringes will be accelerated, as it has great advantages for ophthalmic surgery and is even less likely to be obtainable from America now than it was.—I am, etc.,

Leeds, 1. JOHN FOSTER.

Local Analgesia

SIR,—In the *Journal* of July 16 (p. 139) there appears a review of the book *A Surgeon's Guide to Local Anaesthesia*. But why, oh why, do you have it reviewed by a specialist anaesthetist? The result is just what one would expect—namely, a half-hearted, brief, non-committal statement which does scant justice to the book. It may interest your readers to learn that this book has now reached its third edition, though the two previous editions appeared in Australia only, where they were issued by the author in typescript form owing to wartime difficulty in publishing. The volume is intended to be a guide not only for the practising surgeon but for all who have perforce to do operative work where trained assistance is not available, perhaps in villages far in the country, and who want to learn safe methods that will work and will not fail.

I may say that I am writing this letter because to-day I was proposing to perform an operation for haemorrhoids using caudal analgesia, but having read Mr. C. E. Corlette's strictures upon this somewhat dangerous method of local analgesia I decided to employ the ordinary infiltration method around the anal canal, using 1% procaine with adrenaline solution, 2½ minims to the ounce (0.53 ml. per 100 ml.), and all went well. The point that Mr. Corlette brings out in his book is that the infiltration method is a safe method, whereas the caudal injection is unsafe; it has led to deaths, as can be found in the literature if one takes the trouble to look it up. It is highly probable that a professional anaesthetist does not look with any favour upon a book which shows surgeons how to perform operations safely and reliably, and without troubling the general anaesthetist at all.

The main theme of the book is the author's unique premedication system, which puts the patient in a state of quiet relaxation, physically and mentally, and this enables operations to be performed without producing any mental or nervous strain. The patient either dozes off to sleep, or remains quiet and calm but awake. I have used his method in hundreds of cases, and with great success. Altogether the book is the most complete practical guide that exists at the present time, and the

200 illustrations make it a pleasure to read. What is most valuable is that the author assumes responsibility for every method that he recommends; he has tested all his methods thoroughly, and he speaks from the standpoint of an immense experience of surgery under local analgesia. Furthermore, general practitioners who look into this book will find in it much which they can put to use in their daily work.—I am, etc.,

Dunedin, N.Z. ROLAND A. H. FULTON.

Penicillin in Emergency

SIR,—The extreme value of penicillin in an acute medical emergency due to a penicillin-sensitive organism is illustrated by the following case.

At 2 p.m. I was summoned to a man aged 81 by his daughter, who stated that her father had developed a shivering attack during the morning and now she did not like the look of him. On arrival, the patient was delirious and restless, trying to sit up in bed. Temperature 104.5° F. (40.25° C.), pulse 100, respirations 40. Patient was oblivious of his surroundings and difficult to examine, and there were few physical signs. A provisional diagnosis of septicaemic pneumonia was made. 500,000 units of penicillin were injected intramuscularly. At 4.30 p.m. the patient was rational, knew his family and myself. Temperature 100.5° F. (38.5° C.). Sulphathiazole, 1 g. 4-hourly, by mouth. At 7.30 p.m. the patient was much improved. Temperature 99° F. (37.2° C.), pulse 80. 100,000 units penicillin. The next morning the patient was quite recovered, but somewhat weak. Temperature 97.5° F. (36.35° C.), pulse 70, respirations 16. No abnormal physical signs in lungs or elsewhere.

—I am, etc.,

Leigh-on-Sea. THOMAS REES.

Antiseptics for Minor Dressings

SIR,—With reference to the answer to the question on antiseptics for minor dressings ("Any Questions?" September 17, p. 661), I should like to take your anonymous authority to task for advising the use of proflavine sulphathiazole powder for application to the wounds from minor accidents. I have pointed out previously the dangers of this preparation.[1] Although the incidence of sulphonamide dermatitis due to its local application is not very high in this country, it is an avoidable risk, as sulphonamide is not an essential wound dressing. Sulphonamide dermatitis, particularly the light-sensitive variety, is such a distressing dermatosis that it should be avoided at all costs.

Acriflavine and proflavine have the property of increasing the severity of sulphonamide dermatitis, and Russell and Beck[2] showed that proflavine and sulphonamide mixtures were more lethal to tissues than either substance singly. There is, therefore, even more reason for avoiding proflavine and sulphathiazole mixtures.

As I am afraid that this is so far purely destructive criticism I would like to advise that antiseptics should be avoided as much as possible. The trauma unit at the Royal Infirmary, Sheffield, now uses only "cetavlon" and spirit as pre-operation preparations, and saline and tulle gras as local applications, and there has been a considerable drop in the incidence of contact dermatitis in wounds without noticeable increase in wound sepsis. One still sees, however, a regular supply of cases of sulphonamide dermatitis from those enthusiastic house-surgeons who forget that penicillin powder is 99% sulphathiazole.—I am, etc.,

Sheffield. I. B. SNEDDON.

References

[1] Sneddon, I. B., *Proc. R. Soc. Med.*, 1947, **14**, 883.
[2] Russell, D. S., and Beck, D. J. K., *British Medical Journal*, 1944, **1**, 112.

Myxoedematous Madness

SIR,—I feel I would like to state my opinion that Dr. R. Asher's paper on this subject (September 10, p. 555) is an exceedingly valuable clinical contribution, the importance of which is in no way minimized by the qualifications put forward (September 24) by Drs. E. B. Davies (p. 706) and J. Douglas Robertson (p. 707). Dr. Davies wishes to emphasize that where a psychosis is associated with myxoedema or another endocrinopathy it is not necessarily the result of the endocrine disturbance. This will be readily agreed to, and I do not think that Dr. Asher's article or your annotation intended to indicate otherwise.

However, changes in behaviour pattern, psychoneuroses, and psychoses are not infrequently associated with a major endocrine disturbance—e.g., thyrotoxicosis, myxoedema, adrenogenital syndrome, Cushing's syndrome, Addison's disease, Simmonds's disease, and hypoparathyroidism. When the cure of these disorders or correction of the resulting metabolic disorders is achieved by substitution therapy, operation, or radiation and, following this, the psychoses, etc., disappear, it would seem justifiable to conclude that the endocrinopathy was the immediate cause of the psychoses, the psychoneuroses, or the altered behaviour pattern. This view would not be vitiated by the fact that the psychosis, for example, associated with an endocrine disorder varied in its character and was not constant, because the pattern of the psychotic disorder might well be determined by genetic factors.

I have been particularly impressed by the change in behaviour pattern in patients with hypopituitarism following pregnancy (Simmonds's disease). Whereas hypoglycaemia is an important factor it does not appear to be the sole or constant factor in causing such changes. Of a series of such cases, I have in mind in particular one woman who was a loving wife and mother and who, after the onset of the disease, ceased to have the slightest interest in the well-being of the children or husband, in her own clothes, or in the cleanliness of the household, which deteriorated dramatically. I also recall a woman with Addison's disease whose relatives wrote me after she had been correctly diagnosed and treated that they were deeply grateful for the change in her behaviour and outlook in the home and the return of her normal, kindly, and interested nature. I can hardly consider these features, as well as the major psychoses, chance coincidences.

On the other side of the picture, and in support of Dr. Davies's views, the number of cases one is asked to see of mental disturbances, mental retardations, and delinquencies which have been thought without justification to be of endocrine origin is surprising, although an awareness of the possibility should not be discouraged. Considerable interest has recently been aroused in the general well-being and euphoria produced in patients with rheumatoid arthritis by the use of the pituitary adrenocorticotropic hormone and, on similar lines, by the finding of an increased secretion of adrenocorticotropic hormone after electroconvulsive therapy. It would be prudent, I think, to await further elucidation before becoming excessively enthusiastic about the application of these discoveries to the therapy of psychoses not associated with major endocrine disorders.

As regards the basal metabolism in myxoedema, my experience coincides with that of Dr. Douglas Robertson, and I intimated to Dr. Asher, when he kindly asked me to consider his findings, that uncomplicated myxoedema was usually, if not invariably, associated with a decreased B.M.R.—I am, etc.,

London, W.1. S. LEONARD SIMPSON.

SIR,—The article by Dr. R. Asher (September 10, p. 555) should lead to the more frequent recognition of "myxoedema madness," but in the patient whose condition deteriorates when thyroid extract is administered it should be recognized that it may be dangerous to persist in this form of treatment, as the following short case history displays.

A woman of 58 was admitted to hospital under my care in January, 1949, suffering from confusion and delusions; she appeared to be an obvious case of myxoedema. Treatment with thyroid was commenced (30 mg. thrice daily), but as her confusion increased the dose was doubled. She then became violent and maniacal, refusing to take anything by mouth. This violence alternated with almost complete collapse, when she seemed on the verge of death.

This combination of symptoms suggested that she might be a case of Simmonds's disease, and treatment with testosterone-propionate and desoxycorticosterone was commenced immediately. The improvement was dramatic, and within a few hours she was demanding food. Her condition steadily improved from that date, and her mentality is now almost normal. Her electrocardiograph taken before treatment commenced showed characteristic inversion of the T waves

in the limb leads, which after treatment (except in lead III) have returned to normal. She continues on treatment with testosterone-propionate, but the desoxycorticosterone has been discontinued. Subsequent administration of thyroid has had no beneficial or harmful effect. Her general appearance is still that of myxoedema.

My recognition of this condition was due to an article by A. C. Crooke, clinical endocrinologist, United Birmingham Hospitals (*Practitioner*, 1948, **161**, 298).—I am, etc.,

Maidstone. RONALD LASS.

POINTS FROM LETTERS

Antihistamine Drugs in General Practice

Dr. SIDNEY G. HAMILTON (Woolacombe, N. Devon) writes: There have been many opportunities this summer of trying the new antihistamine drugs in general practice. . . . To be effective, it seems that they should be used early in the treatment. The following two cases are illustrative. (1) After eating strawberries in June a woman of 49 developed an urticarial rash on the face, neck, and right forearm. She treated this with a proprietary cream. She first sought advice two months later. Pyranisamine maleate tablets and cream were prescribed. The irritation was relieved, but the rash showed little improvement. (2) A boy aged 9 was stung by a wasp on the ankle. He had already developed severe symptoms when he was seen 20 minutes later. There was a widespread urticarial rash of the face, body, arms, and thighs. The eyelids and face were swollen, the voice was hoarse, the vision blurred, and he was suffering from violent skin irritation. He was treated with pyranisamine maleate. One ml. of a 2.5% solution was given very slowly intravenously, and 1 ml. subcutaneously. He was also given 0.025 g. of a phenacetin and codeine compound by mouth in order to prolong the action of the drug. The itching of the skin stopped instantly the injection was started, and during the following half-hour the rash and swelling faded gradually. The only abnormal reaction was that of slight nausea. He was seen again four hours later, when he appeared almost normal, though some oedema and rash could still be detected.

Adrenaline in Dysmenorrhoea

Dr. HARRY R. LILLIE (Montreal, Canada) writes: My attention has recently been called by Dr. Cluny Macpherson, of St. John's, Newfoundland, to the use of adrenaline intramuscularly in cases of severe dysmenorrhoea. He has already published his findings under the heading "Pelvic Allergy" in the *Canadian Medical Association Journal* (1949, **60**, 54). Following the case of one young girl to whom Dr. Macpherson had had to give morphine (gr. ½ = 32 mg.) and atropine hypodermically before relief was obtained, he recalled having heard a speaker at the St. John's Clinical Society in 1937 refer to certain cases of dysmenorrhoea as due to pelvic allergy, and he reasoned that such should respond to adrenaline as in asthma. His use of 1 ml. of 1:1,000 adrenaline chloride with this girl was dramatic. She had complete relief in ten minutes, with no recurrence for six months, when again adrenaline was just as effective. He has had uniformly good results in all cases of severe dysmenorrhoea since then, and in severe cases has had some success with "benadryl." Shortly after hearing this I had opportunities of testing Dr. Macpherson's recommendations on three of my own patients with acute dysmenorrhoea. One was a young married girl of 26 with an acute retroversion and flexion, and the other two were slightly older women with no malformation. Only the last of the three suffered from constipation as a contributory factor in the trouble. The results have borne out to the full what Dr. Macpherson found.

Medicine in the Popular Press

Dr. J. H. LANKESTER (Oxted, Surrey) writes: It is irritating to find that patients who read magazines such as *Readers Digest*, *Time*, or *Life* have advance, if uncritical, knowledge of new remedies. I would suggest that a regular section of the *Journal*, under an appropriate title, should be devoted to a review of such press claims. This is sometimes done already (e.g., April 2, p. 599, para. 1 of Medical News), but with insufficient prominence or regularity. This section of the *Journal* could also be used for a preview of new drugs or promising lines of research. Critical appraisement can follow later, but the first knowledge of new things should reach us through the medical rather than the popular press.

Public House Hygiene

Dr. A. PHILIP DRAPER (Romford, Essex) writes: Can any action be taken to improve the hygiene, or rather lack of it, in licensed houses? The present system of dipping used glasses into a pail or other receptacle of already grossly contaminated water would appear to serve no useful purpose, in fact quite the reverse.

Obituary

J. TYLOR FOX, M.D., D.P.M.

Dr. J. Tylor Fox, who died on September 20 at the age of 64, was an authority on epilepsy. A son of the late Dr. Hingston Fox, he belonged to the sixth generation of a family of Quaker doctors.

Joseph Tylor Fox was educated at Bootham, the City of London School, Sidney Sussex College, Cambridge, and the London Hospital, where he won the James Anderson Prize for clinical medicine. He qualified in 1910 and graduated M.B., B.Ch. in the following year. In 1916, accompanied by his wife, he went to Russia as chief medical officer of the Friends' War Relief Expedition. He became medical superintendent of the Lingfield Epileptic Colony in 1918, and two years later he proceeded M.D., going on to take the D.P.M. in 1921. During his twenty-eight years as medical superintendent of the Lingfield Epileptic Colony many extensions were made and four new homes were built, the number of patients and staff there increasing to 600. He knew and took a personal interest in each individual under his care, and he early appreciated the crippling social handicaps borne by epileptics.

In 1930 Dr. Tylor Fox became chairman of the new Permanent Committee on Epilepsy, a body formed mainly to obtain statistical data about epileptics. He then went for a three-months tour of institutions in Europe, seeking information and preparing the ground for the resuscitation of the International League against Epilepsy which had lapsed during the 1914–18 war. The International Neurological Congress in London in July, 1935, commemorated the hundredth anniversary of the birth of Hughlings Jackson. It was particularly appropriate, therefore, that, mainly due to the energy of Dr. Tylor Fox, over thirty doctors attending the congress from fifteen different countries should visit Lingfield and bring the International League against Epilepsy into being again. Dr. William G. Lennox (U.S.A.) was made president; Dr. Schour (Denmark) and Dr. Muskens (Holland) secretaries; and Dr. Tylor Fox was treasurer. Later Dr. Fox persuaded the then Central Association for Mental Welfare, now the National Association for Mental Health, to form a special committee on epilepsy to help epileptics in the community. Dr. Tylor Fox became chairman of this committee and continued in that office until his death.

Dr. Fox retired from Lingfield in 1946, having seen the colony through the war years. Although in poor health, he then devoted much time to a campaign for greater understanding and sympathy towards epileptics. He wrote articles on this theme for both medical and lay publications. Among his articles on the clinical aspects of epilepsy was "Rhythm in Epilepsy," written in collaboration with Dr. Gwenvron Griffiths. This was a survey of the incidence of fits in a group of epileptics over a long period.

Dr. Fox married Elsie, daughter of the late Edwin Gilbert, and she survives him with two sons and a daughter; both sons are following in the family medical tradition.

Dr. Denis Williams writes: Although Tylor Fox will be remembered with deep affection by thousands of epileptic patients, he will have influenced the lives of many more to whom he was quite unknown. He was in the long line of English social reformers, and like so many of them he was quiet and retiring, only expressing himself under the stimulus of other people's needs. He was first of all a personal physician, who in the Lingfield colony had an experience of the medical and social treatment of epilepsy

which cannot have been surpassed. It happened that his work there covered the years of therapeutic advance, when the barbiturates and then the hydantoins became widely used. In that time, too, the electroencephalogram began to throw light on an obscure disease. As each new piece of knowledge appeared he sought it out and applied it. Although he was an expert in this field he did not write much, for he was too reticent, but his opinion, sought personally, was careful and experienced. Perhaps it was more than reticence that limited his writings; perhaps it was that Tylor Fox was more concerned for people with epilepsy than for epilepsy. In the social care of his patients he was both eloquent and active, and that activity went far beyond his own colony. Although he had retired from Lingfield, when he died he was president of the British branch of the International League against Epilepsy, and chairman of the epilepsy committee of the Association for Mental Health, as well as chairman of the Lebanon Hospital in Beirut, like his uncle before him. Through these bodies he continued his work, but he still did much by personal contact and persuasion. He was always concerned with problems of education, of employment, and of public enlightenment for the good of the epileptic. When he was absent from the recent meetings in Paris there were inquiries about his welfare and work from those interested in epilepsy in many of the countries of Europe and of the States of America. His work has made him very widely known.

Dr. Denis G. Kennedy writes: When Dr. Fox handed over Lingfield Epileptic Colony to me in the summer of 1946 he was a very tired man. The running of the colony during the war years, perhaps more than any other similar institution, had been a work of extraordinary difficulty. Dr. Fox had two great interests in life—namely, his clinical work and his social work on behalf of epileptics—and during his later years at Lingfield he had found the administrative duties of his post take a heavier and heavier toll of his time and energies. He was, I think, glad to hand over his administrative work, and looked forward keenly to devoting the whole of his time to what had become his main interest—the removal from the public mind of prejudices concerning the epileptic. His single-mindedness in the pursuit of this aim, born as it was of his keen sense of social service, had an intensity rather strange to see in a post-war world of disillusion and apathy. He was a man of great tolerance to the frailties of human nature, and in consequence made many lasting friends. Up to the very last he was working hard in the cause he had made his own, and his tragic death leaves a painful void in the circle of people whose lives are devoted to the care of epileptics. At Lingfield Colony he has left a name which will be remembered with affection and esteem for a very long time.

R. E. BICKERTON, D.S.O., M.B.

Mr. Reginald Ernest Bickerton, the well-known ophthalmic surgeon, died peacefully on September 13 at the age of 79, after two years of steadily failing health. His father was Thomas Bickerton, F.R.C.S.Ed., of Liverpool, and he was a student at Liverpool University, where he graduated M.B., Ch.B. in 1895. He was successively house-physician, house-surgeon, ophthalmic assistant, and senior resident medical officer at the Liverpool Royal Infirmary. Later he visited and held ophthalmic appointments in Berlin, Vienna, Munich, Utrecht, and Zurich. After his marriage in 1899 he settled in London and was appointed ophthalmic surgeon and lecturer to the "Dreadnought" Seamen's Hospital, Greenwich. Mr. Bickerton served this hospital for 42 years, a record hardly equalled throughout its long history. On the advent of the National Health Service he received the unusual honour of being unanimously elected a vice-president of the hospital.

Mr. Bickerton was consulting surgeon to the Hornsey Central Hospital, the Royal Waterloo Hospital, London, and the Evelina Hospital for Sick Children. The late Sir Arthur Pearson personally put him in charge of blinded soldiers and sailors at St. Dunstan's, which post he held from the end of the 1914–18 war until the outbreak of the second world war, when the blinded ex-Servicemen were removed from London. He was also ophthalmic surgeon to the Children's Clinic, Marylebone Road; chairman and honorary ophthalmic surgeon to the Royal School for the Blind at Leatherhead; and chairman of the Hawksley Pension Fund for the Blind of the professional classes. He acted as a medical referee for ophthalmic cases under the Workmen's Compensation Act, and was visiting ophthalmic surgeon to the Ministry of Pensions Hospital, Richmond.

He joined the Territorial R.A.M.C. in 1909 in response to Lord Roberts's urgent appeal at that time, and was promoted captain in 1912. He was mobilized in 1914, though over age, and later with the rank of lieutenant-colonel he commanded the 84th (London) Field Ambulance, which was attached to the 28th Division, serving in the British Expeditionary and Salonika Forces, in the Army of the Black Sea, and in Belgium, Turkey, and Asia Minor. He was appointed A.D.M.S. of the Army of the Black Sea in 1919 and was twice mentioned in dispatches. He had been awarded the D.S.O. in 1917, and he was appointed honorary surgeon to the King from 1927 to 1932. Since 1932 he had been honorary colonel of the 56th Division (1st London) T.A. Mr. Bickerton was responsible for a number of contributions to the literature of his specialty, and he was particularly interested in mustard gas burns affecting the eyes. He was honorary secretary of the Section of Ophthalmology at the Annual Meeting of the B.M.A. in 1927 and vice-president of the Section in 1938.

Mr. Bickerton was held in great esteem by his patients and his colleagues, and indeed by all who came in contact with him. His gentle but firm behaviour, his old-world courtesy, and his loyalty to his friends were as impressive as his undoubted skill as an ophthalmic surgeon. He endeared himself to everyone, and his name will always be held in affection by his many friends and particularly by those blinded officers and men for whom he cared. He took much more than a professional interest in them, and they greatly appreciated his wise and generous friendly advice. In the same way there must be thousands of merchant seamen who are grateful both for his skill and for his kindness.

A requiem mass was held on Monday, September 19, at All Saints, Margaret Street, W.1, of which for some years, till his health failed, Mr. Bickerton had been churchwarden. There many representatives of the medical profession, of St. Dunstan's, of the Seamen's Hospital, and of the blind and staff of the Royal School for the Blind, and many others paid tribute to his memory.

G. C. WILLIAMS, O.B.E., M.R.C.S., D.P.H.

Dr. Geoffrey Commeline Williams, who was senior administrative medical officer to the Oxford Regional Hospital Board, died on September 21 at the age of 57. He was born at Thornbury, Gloucestershire, where his father was in medical practice, and was educated at Clifton College, Caius College, Cambridge, and Bristol. In 1916 he qualified, and he went on to take the Bristol D.P.H. in 1921. He took the Cambridge M.A. degree before starting his clinical studies, and he was also, by incorporation in 1937, M.A.(Oxon), becoming a member of Brasenose College. In the 1914–18

war he served overseas as a captain in the R.A.M.C. For a short time after demobilization he filled the post of assistant medical officer to the Bristol City Fever Hospital and Sanatorium.

Dr. Williams came to Oxford as assistant medical officer of health in 1921, becoming deputy M.O.H. later. In 1930 he was appointed medical officer of health to Oxford County Borough Council. He was awarded the O.B.E. in 1942 for his services to public health generally and to civil defence in particular. It was in October, 1947, that he became senior administrative medical officer to the Oxford Regional Hospital Board. Dr. Williams was a Fellow of the Society of Medical Officers of Health, a Fellow of the Royal Sanitary Institute, an officer of the Order of St. John, and county surgeon to the St. John Ambulance Brigade. He was formerly an examiner in public health to the University of Oxford, a past chairman of the Oxford and District Public Medical Service, and a member of the committee of the Nuffield Institute of Social Medicine and of the Council of the medical staff of the United Oxford Hospitals. He was also a member of the joint county committee of the British Red Cross Society and the Order of St. John. In 1936 he was vice-president of the Section of Public Health at the Annual Meeting of the B.M.A. He married Irene Mary Durant in 1919, and she survives him with one daughter.

W.S. writes: Men like "Billy" Williams can ill be spared at any time, least of all in these days when so much hinges on a fair and equitable administration of the new health services. While medical officer of health for Oxford, and more recently as senior administrative medical officer to the regional board, his faith and trust in the members of his staff drew forth the most profound loyalty from each and everyone, and he inspired the confidence of the profession and public alike. He was a first-class administrator, and approached the innumerable problems much more from the human side than from the point of view of regulations and orders, if they happened to be incompatible. He was perhaps at his best in times of stress, when his calm and equable character shone forth conspicuously. His discreet and tactful intervention at committee meetings many times smoothed out what might have developed into an awkward situation. Only his intimate friends knew how much help he gave to others in trouble or difficulties. Like so many others in both wars, he lost the opportunity of proceeding to higher degrees by volunteering for service in the Forces immediately after qualifying. Williams was a man of the highest integrity, and everyone with whom he came into contact soon recognized his quality. While medical officer of health for Oxford his relations with the general practitioners were particularly happy. He had few hobbies, but until he became absorbed in civil defence duties he enjoyed a round of golf, at which he was quite a fair performer. There was a pathetic appropriateness in the fact that he spent the last days of his life in the Slade Hospital, a modern institution for infectious diseases for the construction and planning of which Williams was largely responsible. His death has left a feeling of intense sadness in many Oxford homes, and there will be deep heartache among those who were privileged to be associated with him in his many activities. To his courageous and devoted wife and daughter the deepest sympathy will be extended by all who knew him.

G. J. STEFANOPOULO, M.D.

When a French military aeroplane landing at Pointe Noire on September 19 burst into flames, French tropical medicine lost one of its most distinguished exponents. Dr. G. J. Stefanopoulo, who was one of the eighteen people killed in this accident, was a *chef de service* at the Pasteur Institute in Paris. He was born in Greece in 1893 and was educated at the Universities of Athens and Montpellier. After service in the first world war he became an assistant to Professor Auguste Pettit, and with him did much to elucidate the part played by pathogenic leptospira in the causation of leptospirosis icterohaemorrhagica. When Noguchi claimed that yellow fever was due to a spirochaete Stefanopoulo's interests became centred in yellow fever. As a result of his visits to tropical Africa he mapped out the distribution of yellow fever in the French African Colonies, and in collaboration with British workers he was the first to point out the significance of monkeys in the maintenance of yellow fever in Africa.

In accordance with the traditions of the Pasteur Institute he early focused his attention on the possibilities of immunization against yellow fever, and his laboratories in Paris have for many years been immunizing nearly 40,000 persons a year. On one of his many visits to Africa he became infected with *Loa loa*, for which at the time there was no satisfactory treatment. Stefanopoulo was one of the first to use hetrazan not only curatively but prophylactically against filarial infections. At the time of his death he was visiting French Equatorial Africa at the request of the Minister for the Colonies to advise on how living conditions could be improved for Europeans working in the Tropics.

During the recent war Stefanopoulo was a member of the resistance movement. He was a great admirer of this country, where he was well known and had many friends. He took part this year in the discussions of the Section of Tropical Medicine at the Annual Meeting of the British Medical Association at Harrogate and read a paper on his investigations on *Loa loa* infection. For many years before the second world war Stefanopoulo represented Greece at the meetings of the Office Internationale d'Hygiène Publique. He was a member of the Greek Academy of Medicine and an Officer of the Legion of Honour. The sympathy of many friends in this country will be extended to his wife and two young children in their tragic loss.—G. M. F.

Dr. Donald Ross, who was formerly medical superintendent of the Argyll and Bute mental hospital, died at Ardrannich, Inveraray, on August 25. Dr. Ross received his early education in Switzerland and at Dollar Academy, where he achieved distinction in his studies and in sport, winning the medal for modern languages in his final year. At Edinburgh University he graduated M.B., Ch.B. in 1908, and subsequently held appointments at Edinburgh Royal Infirmary, Melrose Institution, Edinburgh Royal Asylum, and Glasgow Royal Asylum. He was appointed medical superintendent of the Argyll and Bute Mental Hospital, Lochgilphead, in 1914, and this appointment he held until his retirement in August, 1946. Dr. Ross was admitted M.R.C.P.Ed. in 1928. He was a secretary of the Caledonian Medical Society and a committee member of the Royal Medical Psychological Association, which he represented on several occasions at international congresses. He was a founder of the Campbell Clark Medal for Mental Nursing, and made a number of contributions to the medical literature. He was chairman of the Argyll Division of the British Medical Association in 1934 and again in 1939. Following the promise of earlier years he became a fluent linguist in eight languages—French, German, Gaelic, Flemish, Italian, Arabic, Urdu, and Spanish. He learned Gaelic after his appointment at Lochgilphead so that he could converse freely with patients who knew no other language. For several years he was a member of the executive council of An Comunn Gaidhealachd and secretary of Mid-Argyll Branch. He was an authority on ancient monuments, particularly those in and around Argyll, and a Fellow of the Society of Antiquaries. Dr. Ross was associated with the Territorial Army from its inception in 1908, and served as

a captain in the 1914–18 war and as a colonel in the recent war. Between the two wars he was regimental medical officer of the 8th Argyll and Sutherland Highlanders, and for his services was awarded the M.B.E. and the T.D. Throughout his life he was keenly interested in sport and played rugby for Edinburgh University, the Melrose, Hawick, and Jedforest clubs, and for the Army against France as wing three-quarter. While a student he won medals for 220 yards flat races on two occasions, and in later years he was a judge of racing and heavy events at the Highland Gatherings at Oban and Mid-Argyll. It was his invariable custom before the war to walk over the hills alone from Lochgilphead to the Oban Games, and after the games he made the return journey by the same route. Dr. Ross was deeply interested in the welfare of the county, and was an elder of Lochgilphead Parish Church, a local justice of the peace, and a founder of Lochgilphead Ex-Servicemen's Institute. He is survived by his wife, four sons, and four daughters. Two of his sons are in the medical profession, and one of his daughters is the matron of Argyll and Bute Mental Hospital.—J. A. A.

Dr. BASIL JOHN FRANCIS JACKSON-TAYLOR, who died on August 18, had spent 38 years in general practice. He was a student at King's College Hospital, and qualified in 1904. After some years spent in resident hospital appointments at the London Temperance Hospital and at Bagthorpe Infirmary, Nottingham, he settled in practice at Hucknall, Notts, where he built up a large general practice from which he retired in 1926. He then took a small practice in Horley, Surrey, intending to lead a quieter life. However, his qualities soon led to such demands for his services that it was many years before he was able to secure the leisure which he desired and needed. Dr. Jackson-Taylor had for 20 years been divisional surgeon to the St. John Ambulance Brigade, a unit which he had largely helped to build up in Horley. He was for many years a member of the executive committee of the Reigate Division of the B.M.A., and was chairman of the Division during 1935 and 1936. He took a prominent part in the discussions preceding the present National Health Act and did not conceal his doubts about the wisdom of that measure, an opinion with which many of his past opponents now agree. He was a man of shrewd insight and clinical ability, with an equable mind and a kindly disposition. Never did these qualities show to better advantage than at the time during which he well knew what lay before him. A large circle of friends, colleagues, and patients have learned of his passing with deep regret.—K. W.

Dr. WILLIAM STEWART, of Denton, died at his home there on September 3. He was one of the best-known practitioners in the district and had always taken an active part in local affairs. William Stewart was born in Ireland, and graduated at Queen's College, Belfast, in 1887. As a student he won the prize in surgery in 1886. He was at Longton, Staffs, as a locumtenent for a short time and later at Salford. Then in 1888 he settled in Denton and was in general practice there for 57 years. Dr. Stewart's association with the St. John Ambulance Brigade began as long ago as 1903. He lectured to both the ambulance and nursing divisions for many years, and he was promoted a Commander of the Order of St. John of Jerusalem in 1932. During the 1914–18 war he was in charge of the Denton Red Cross Hospital, and in September, 1939, he was appointed honorary medical officer for the Denton first-aid post. Dr. Stewart was honoured in 1944 with the insignia of Knight of Grace of the Venerable Order of St. John, and in 1945 he was presented with an illuminated address paying tribute to his services as a general practitioner and as medical officer of health to the district from 1910 to 1939. Dr. Stewart was one of the old type of family doctors who earned and held not only the esteem but the affection of all his patients.

Dr. JAMES KEARNEY, of Wanstead, London, E.11, died suddenly on September 5 while on holiday. He qualified at Dublin in 1913, and in the first world war he served as a captain in the R.A.M.C. After demobilization he went into general practice in Leytonstone and became a partner in one of the oldest established practices there. Among the appointments that he held were those of district medical officer for Leyton, honorary medical officer of the Essex County Nursing Association, and during the recent war he served on the National Service medical boards and in the Home Guard. He took a keen interest in the work of the Leytonstone Branch of the British Legion and in many other local activities. Possessed of a strong personality, Dr. Kearney was well known for his forthright manner. He was an outstanding example of the old-type family doctor, and he was much loved by all his patients, knowing every detail of their personal and family history and always giving them unstinted service. His practice was his all-absorbing interest, and in spite of failing health he carried on to the last, dying, as he had wished, in harness. He is survived by his widow, one son who is studying medicine, and two daughters, to whom the sympathy of his colleagues and friends will be extended.

Dr. HARRY SMITH, who died on September 16 at the age of 48, was a popular and influential figure in the public health service of London. Dr. Smith was one of the nine divisional medical officers appointed to administer the local health authority services of the London County Council. He took up this post in April, 1948, and was in charge of the division which included Chelsea, Fulham, Hammersmith, and Kensington. His energy, his skill in health administration, and his ability to get on with all types of men, women, and, above all, children eased the process of establishing the new structure. Dr. Smith's easy charm, his wide knowledge of the law and practice of public health, and his ready adaptability to new circumstances quickly gave him a high reputation among his colleagues, the members of the divisional health committee, and the wide section of the population with whom he came into contact. Resolutions of appreciation of his service have already been sent from several of the voluntary organizations in his division. Dr. Smith was a student at St. Bartholomew's Hospital. After qualifying in 1924 he held resident appointments in hospitals in Rugby and London before going into general practice for five years. He used to look back at this part of his career, spent in rural practices in the West of England, with particular affection, and to say that the intimacy of the personal contacts one was able to make in general practice provided a quality which was never attainable in other branches of the profession. For two years Dr. Smith was an assistant school medical officer at Plymouth and then, from 1934 for four years, assistant medical officer of health at Portsmouth. His varied experiences in these appointments were part of the equipment which made him so valuable when he joined the London service in 1938. His first important work in London was in the slum-clearance programme which before the war constituted a large and important part of the department's functions. During the war he undertook duties connected with the school health service, the medical examination of staff, first-aid training, and other problems. He was promoted to divisional medical officer in 1941, and principal assistant medical officer in 1946. On his way to work in 1944 he was nearly killed by a bomb which fell in York Road just outside Waterloo Station. The memorial service at St. Mary Abbot's Church, Kensington, was attended by a large and representative gathering of friends and colleagues who mourned the departure of one whose personal qualities they loved and whose devotion to the public service was a source of inspiration to all who knew him.—A. D.

The Nurses and Midwives Whitley Council has agreed on higher salaries for ward sisters, charge nurses, deputy ward sisters, deputy charge nurses, and staff nurses employed in mental hospitals, and for midwives employed in maternity hospitals and homes and maternity units or wards of other hospitals. The increases are consequential to the agreement reached previously for nurses employed in general hospitals. The Whitley Council has also agreed on the salaries of part-time enrolled assistant nurses, staff nurses, and ward sisters who are employed in general hospitals. Nurses employed for not more than 40 hours a week will be paid on a sessional basis. For a session of four hours the rates are: enrolled assistant nurse, 10s.; staff nurse, 11s.; ward sister, 13s. 4d. In addition meals on duty will be given and uniform provided and laundered free.

Medico-Legal

DEATHS FOLLOWING INJECTIONS OF CONVALESCENT MEASLES SERUM

Mr. W. Bentley Purchase, coroner for St. Pancras, on September 26 concluded an inquiry into the deaths of three children—Pauline Hallett, Richard Taviner, and Brian Wood, all of Hornsey, and all aged 3 years.

Dr. John Harrington, of the Central Public Health Laboratory, Colindale, said that on July 1 he injected a number of children at a day nursery with anti-measles serum. Five children received injections from one particular batch of serum, and three of these were the children who had died. All were measles contacts, and none of them had a history of measles. These five children were not injected consecutively, but were spaced out among a number of others. The only point in common in the case of the five was that they received serum from the same batch. The syringes were changed after every fourth injection, and a fresh needle and a fresh charge of the syringe were used for each child.

Dr. W. C. Cockburn, also of the Central Public Health Laboratory, Colindale, said that the batch in question was known as "309." Asked how it came about that only five children were inoculated from this particular batch, he said that that was just as it happened; there was only a small amount of serum available at the time. There was no selection about it. There was no reason to suspect any difference between this batch and other batches. The experience of the other children inoculated on the same day from the other batches presented nothing of significance. There was no reason to doubt that the syringes were perfectly sterilized.

Dr. R. A. Zeitlin said that the Blood Transfusion Department of the Central Laboratory had collected this serum from 60 normal adults. So far as was known there was nothing to arouse suspicion serologically. Among the 60 it had been discovered that five had had jaundice, but in all cases the attack took place very many years ago, far earlier than the beginning of any danger period. He agreed with the coroner that, lamentable as these three deaths were, the public danger, having in mind the large numbers continually served from his laboratory, was infinitesimal.

Dr. F. E. Camps said that the boy Taviner and the girl Hallett both showed at post-mortem examination a necrosis of the liver, which was rather less marked in the girl. Dr. Alfred Piney said that he had made a post-mortem examination of the boy Wood, and here too there could be no doubt that death was due to necrosis of the liver.

The coroner said that he was entirely satisfied from the evidence of Dr. Harrington, who gave the injections, and of Dr. Zeitlin, who was in charge of the laboratory from which the serum was obtained, that there was no obvious source of infection or anything of that kind. There was no sort of neglect or lack of care. In each case he returned a verdict of "Death by misadventure."

Universities and Colleges

UNIVERSITY OF LEEDS

The inaugural lecture of the Faculty of Medicine will be given in the Riley-Smith Hall of the University Union on Friday, October 7, at 3 p.m., by Professor John Cruickshank, C.B.E., M.D. His subject will be "Medicine, To-day and To-morrow." Members of the medical profession are invited.

UNIVERSITY OF SHEFFIELD

Mr. E. F. Finch, M.D., M.S., F.R.C.S., vice-president of the Royal College of Surgeons of England, will deliver the opening sessional address of the Faculty of Medicine in the Firth Hall of the University on Friday, October 21, at 5 p.m. His subject will be "The Evolution of Medical Education."

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended September 10. [No. 36

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1949 (a)	(b)	(c)	(d)	(e)	1948 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	38	2	12	4	1	26	2	13	2	2
Deaths		—	2				—	—		
Diphtheria	66	9	21	—	4	136	15	60	5	3
Deaths	—	—	—	—	—	1	—	—	—	—
Dysentery	59	5	92	—	3	84	12	53	—	—
Deaths				—	—				—	—
Encephalitis lethargica, acute	2	—	2	—	—	2	—	—	—	—
Deaths							—			
Erysipelas			33	5	5			27	9	2
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				139					46	
Deaths	31	3	9	7	5	26	2	14	2	1
Measles*	875	66	43	22	43	2,608	88	35	28	34
Deaths†			—	—	—			—	—	—
Ophthalmia neonatorum	38	2	5	—	—	53	2	9	—	—
Deaths										
Paratyphoid fever	20	—	1 (B)	4 (B)	—	32	2	3 (B)	—	—
Deaths	—	—	—	—	—	—	—	—	—	—
Pneumonia, influenzal	205	9	5	—	1	261	11	—	2	2
Deaths (from influenza)‡	—	—	—	—	—	3	—	1	—	—
Pneumonia, primary			109	5				121	14	
Deaths	99	12		6	4	130	21		8	4
Polio-encephalitis, acute	22	4				4	1			
Deaths										
Poliomyelitis, acute	284	27	7	—	4	72	7	3	2	—
Deaths§	16	1				3	—			
Puerperal fever		—	5				—	10		—
Deaths										
Puerperal pyrexia‖	103	8	1	—	3	79	10	12	—	—
Deaths		—					—			
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	729	66	137	88	69	833	61	197	55	29
Deaths†			—	—	—			—	—	—
Smallpox	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Typhoid fever	3	—	4	5	—	28	1	13	2	1
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Whooping-cough*	1,228	60	62	87	71	2,877	229	110	58	11
Deaths	7	—	—	—	1	10	1	—	—	—
Deaths (0–1 year)	221	27	37	29	10	260	32	52	26	10
Deaths (excluding still-births)	3,862	597	496	149	103	3,840	578	527	177	108
Annual death rate (per 1,000 persons living)			9·9	9·2				10·6	11·1	
Live births	7,208	1223	832	409	190	7,565	1157	834	450	207
Annual rate per 1,000 persons living			16·7	25·3				16·8	28·1	
Stillbirths	173	19	29			185	25	33		
Rate per 1,000 total births (including stillborn)			34					38		

* Measles and whooping-cough are not notifiable in Scotland, and the returns are therefore an approximation only.

† Deaths from measles and scarlet fever for England and Wales, London (administrative county), will no longer be published.

‡ Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

§ The number of deaths from poliomyelitis and polio-encephalitis for England and Wales, London (administrative county), are combined.

‖ Includes puerperal fever for England and Wales and Eire.

EPIDEMIOLOGICAL NOTES

Poliomyelitis

The total number of notifications in the week ended September 17 was: poliomyelitis 311 (284), polio-encephalitis 31 (22). Figures for the previous week are shown in parentheses. These are the highest recorded this year.

Multiple cases (poliomyelitis and polio-encephalitis together) were reported from the following counties: London 41 (31), Berkshire 7 (4), Chester 4 (6), Cornwall 10 (3), Devon 5 (5), Dorset 3 (5), Durham 7 (7), Essex 18 (16), Gloucester 15 (10), Hertford 4 (5), Kent 16 (9), Lancaster 29 (38), Leicester 13 (7), Lincolnshire, Kesteven 5 (2), Lincolnshire, Lindsey 7 (1), Middlesex 25 (19), Norfolk 3 (1), Northampton 3 (1), Northumberland 10 (8), Nottingham 11 (16), Somerset 8 (3), Southampton 10 (15), Stafford 3 (4), Surrey 14 (9), East Sussex 2 (4), Warwick 10 (10), Wiltshire 6 (8), Yorks East Riding 5 (4), Yorks North Riding 2 (1), Yorks West Riding 33 (25), Glamorgan 3 (7).

In 1947 the total figures for the corresponding week were poliomyelitis 572, polio-encephalitis 42. In 1947 this was the week in which the fall in notifications began.

Discussion of Table

In *England and Wales* there was a decrease in the notifications of whooping-cough 387, measles 293, and dysentery 39, while the largest increase was in the incidence of scarlet fever 28.

The fall in the incidence of whooping-cough was contributed by a few areas, notably Lancashire 60, Middlesex 55, Yorkshire West Riding 39, Northamptonshire 39, and Lincolnshire 23. In most areas there was a fall in the incidence of measles, and for the first time since the beginning of 1946 notifications fell below 1,000 a week. No variations of any size occurred in the local trends of scarlet fever. About one-third of the total cases of scarlet fever were notified in three areas—London, Lancashire, and Yorkshire.

Notifications of diphtheria were 13 more than in the preceding week. The largest increases were Staffordshire 6 and Lancashire 5; London 9 and Liverpool 8 accounted for one-quarter of the total notifications of diphtheria.

Of the 20 cases of paratyphoid fever 10 were notified in the county boroughs of Lancashire. A further 11 cases of dysentery were notified in Northumberland, Gosforth U.D., where 21 cases were notified in the preceding week. In Liverpool C.B. 9 cases of cerebrospinal fever, one-quarter of the total cases, were notified.

Notifications of food-poisoning came from London 32 (Islington 12); Essex 63 (Southend-on-Sea C.B. 33, Ilford M.B. 14); and Gloucestershire 20 (North Cotswold R.D. 11).

In *Scotland* there was an increase in the notifications of dysentery 17 and scarlet fever 10, with a decrease in the incidence of whooping-cough 10. An outbreak of dysentery with 13 notifications occurred in Stirling county; other centres of infection were Glasgow 59 and Edinburgh 8. In Glasgow the notifications of scarlet fever rose from 28 to 43.

In *Eire* there was a rise in the notifications of whooping-cough 26 and scarlet fever 19, with a decrease of 20 in the notifications of diarrhoea and enteritis. The incidence of diarrhoea and enteritis remained high in Dublin C.B., with 115 notifications.

In *Northern Ireland* an increase was reported in the notifications of measles 23 and scarlet fever 18.

Quarterly Return for Scotland

The birth rate during the June quarter was 19.7 per 1,000, and was 0.7 below the average of the five preceding second quarters. The infant mortality rate was 36 per 1,000 registered live births, being 15 below the five years' average and the lowest rate ever recorded for any quarter in Scotland. The general death rate was 11.8 per 1,000 and was 0.1 below the five years' average. The death rate from all forms of tuberculosis was 69 per 100,000, and from respiratory tuberculosis 60; these rates were respectively 15 and 11 below the rate for the second quarter of 1948 and 13 and 3 below the five years' average. Deaths attributed to the principal epidemic diseases numbered 111, being 39 more than in the second quarter of 1948. These deaths include 62 from influenza, 25 from whooping-cough, 11 from cerebrospinal fever, and 9 from measles. Deaths from violence numbered 662, and were 74 more than in the second quarter of 1948, although deaths attributed to road accidents declined by 7.

Week Ending September 17

Notifications of infectious diseases in England and Wales during the week included: scarlet fever 942, whooping-cough 1,180, diphtheria 78, measles 688, acute pneumonia 211, cerebrospinal fever 34, acute poliomyelitis 311, acute polio-encephalitis 31, dysentery 86, paratyphoid fever 18, typhoid fever 4, food-poisoning 267.

Medical News

Barrow-in-Furness Clinical Society

Meetings of this society, which lapsed during the war, are to be held again. The society intends to meet at 8 p.m. on the fourth Tuesday in each month from October to March inclusive, usually at the Orthopaedic Clinic, North Lonsdale Hospital. The subscription is 5s. a year. Particulars may be obtained from the secretary, Dr. John Fawcitt, Fountain Street House, Ulverston, Lancs.

Smoke Abatement

The Public Health (Smoke Abatement) Act, 1926, empowers the Minister of Health to make orders extending the provisions of the Alkali, etc., Works Regulation Act, 1906. Orders have been issued at various times extending the list of noxious or offensive gases mentioned in the Act of 1906, and extending the list of scheduled works requiring registration under the Act. A draft Order has now been prepared further extending the list of gases and works. A public inquiry will be held into the subject matter of the draft Order at the offices of the Ministry of Health, Caxton Hall East, Tothill Street, London, S.W.1, on October 18 at 2.30 p.m. It will be open to the Press, and any interested person may attend and give evidence. Copies of the draft order may be seen at the Ministry of Health, Whitehall, or purchased either directly or through any bookseller from H.M. Stationery Office.

Société d'Hématologie

At the recent meeting of the Société Internationale Européenne d'Hématologie, held at Montreux, Dr. A. Piney was elected vice-president of the society.

Lead Nipple Shields

The Ministry of Health has informed executive councils of evidence that lead encephalopathy in babies has been caused by mothers using lead nipple shields. A notice on the subject is being sent to medical practitioners and chemists, and the entry in the Third Schedule of the General Medical and Pharmaceutical Services Regulations, 1948, will be amended as soon as practicable to exclude lead nipple shields.

Contaminated Milk

The powers of local authorities and medical officers of health are extended under the Food and Drugs (Milk and Dairies) Act, 1944, which comes into operation on October 1 of this year, and its subordinate legislation. The supply of milk may now be stopped in respect of any disease communicable to man by consumption of milk; the powers formerly extended only to infection with notifiable disease, including dysentery.

Wills

Dr. William James Bennett-Jones, formerly consulting anaesthetist to the Royal Liverpool United Hospital, left £6.860. Dr. Graham Lionel John Wilson, of Teddington, Middlesex, left £20,347; Dr. Henry Winstanley, of Billinge Higher End, near Wigan, £18,695; Surgeon Commander Albert Brooke-Bateman, R.N., £1,854; and Dr. Haldinstein David Haldin-Davis £36,882.

COMING EVENTS

Hunterian Society

The Hunterian Society has arranged a party to be held at Gunter's, 6, Stanhope Gate, London, W., on Thursday, October 6, at which there will be an exhibition of the society's history and relics of John Hunter, together with an important series of legal documents relating to his life and of his little-known son, J. B. Hunter, which has recently come into the possession of the society.

Lectures: The Design of Experiment

The Oil and Colour Chemists' Association (Aldwych House, Aldwych, London, W.C.2) has arranged three postgraduate lectures on "The Design of Experiment—The Development of Experimental Methods and Theoretical Ideas in a Field of Research" to be given by Professor M. G. Evans, D.Sc., F.R.S., at the Royal Institution, 21, Albemarle Street, London, W., on Thursdays, October 6, 13, and 20, at 6.30 p.m. The inclusive charge for the course to members and visitors is 10s., and applications for tickets should be sent in advance to John Hannaford, secretary and treasurer, at the above address. Admission to junior members is free of charge, but those interested must apply for complimentary tickets.

Royal Dental Hospital of London

The prize distribution and conversazione of the Royal Dental Hospital of London School of Dental Surgery (University of London) will be held at the Royal Dental Hospital, 32, Leicester Square, London, W.C., on Friday, October 7, at 8 p.m.

Birmingham Regional Consultants Committee

The Birmingham Regional Consultants and Specialists Committee will hold a meeting at the Queen Elizabeth Hospital on October 11 at 5.15 p.m. Items on the agenda include reconstitution of the committee and grading. Members are asked to obtain from their groups information about these subjects.

National Society of Children's Nurseries

A conference on "The Training and Examination of the Nursery Nurse as seen in 1949" has been arranged by the National Society of Children's Nurseries (Norfolk House, Norfolk Street, Strand, London, W.C.2), to be held at County Hall, Westminster Bridge, London, S.E., on Friday, October 14, from 11 a.m. to 5 p.m. The speakers will be Sir Allen Daley, M.D., F.R.C.P., K.H.P., Dr. Ruby N. E. Pike, Miss Hilda Hincks, Mr. H. W. Brand, Miss D. E. Harvie, Miss H. Howse, Mrs. A. Creech Jones, and Mr. J. H. Lloyd. Tickets of admission may be obtained from the honorary secretary of the society at the above address.

Royal Institute of Public Health and Hygiene

A series of lectures will be given at the Royal Institute of Public Health and Hygiene, 28, Portland Place, London, W., on Wednesdays, at 3.30 p.m., from October 19 to November 30. Details will be published in the diary column week by week. Admission to the lectures is free, without ticket.

The Tutor in the N.H.S.

A conference on "The Tutor in the National Health Service" will be held at the Royal College of Nursing, Henrietta Place, Cavendish Square, London, W., on Monday, Tuesday, and Wednesday, November 14, 15, and 16. Tickets of admission may be obtained from the conference secretary of the College at the above address before October 15.

SOCIETIES AND LECTURES

Saturday

ST. STEPHEN'S HOSPITAL (RHEUMATISM UNIT), 369, Fulham Road, London, S.W.—October 1, 10 a.m., "*Some Social and Economic Aspects of the Chronic Rheumatic Diseases*," introductory address by Sir Ernest Rock Carling; 11 a.m., "*Some Modern Aetiological Concepts and Clinical Variants of Rheumatic Joint Diseases*," by Dr. Philip Ellman; 12 noon, "*The Management of the Rheumatoid and Osteoarthritis Types of Chronic Arthritis*," by Dr. Francis Bach; 2 p.m., "*Ward Round and Demonstration of Methods of Physical Treatment Injection and Plaster Technique*," by Dr. Francis Bach and medical registrars; 3 p.m., "*Social Welfare, Dietetics, Occupational Therapy, and Vocational Guidance*," by Dr. Francis Bach and members of the staff of Rheumatism Unit; 4.15 p.m., "*Clinical Pathology in Gout and the Rheumatic Diseases*," by Dr. A. G. Signy; 5.15 p.m., "*The Radiological Diagnosis of the Rheumatic Diseases*," lantern lecture by Dr. Grace Batten.

Sunday

ST. STEPHEN'S HOSPITAL (RHEUMATISM UNIT), 369, Fulham Road, London, S.W.—October 2, 10 a.m., Ward Round with Demonstration of cases by Dr. Philip Ellman and medical registrars; 11.15 p.m., (1) "*The Non-Rheumatic Arthritides and Allied Lesions in General Medicine*," (2) '*Use and Abuse of Drugs in the Rheumatic Diseases*," lectures by Dr. Philip Ellman; 2 p.m., "*Orthopaedic Aspects of Rheumatic Disease and the Prevention and Treatment of Deformities*," by Mr. Timbrell Fisher; Demonstration of cases and treatment by manipulation (if cases are available), by Mr. Timbrell Fisher and medical registrars; 3.30 p.m., "*Radiotherapy in the Treatment of the Rheumatic Diseases*," by Dr. Jackson Richmond; 4.30 p.m., "*Pain—'Neuritic and Referred,'*" by Dr. C. Worster-Drought; 5.15 p.m., "*Psychogenic Rheumatism*," by Dr. David Shaw.

Monday

INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, London, W.C.—October 3, 2.30 p.m., "*The Treatment of Facial Paralysis*," by Miss D. J. Collier.

Tuesday

CHADWICK TRUST.—At the Art Gallery, New Walk, Leicester, October 4, 4.30 p.m., "*Public Opinion and Public Health in the Age of Chadwick*," Chadwick Public Lecture by Mr. Asa Briggs.

INSTITUTE OF OBSTETRICS AND GYNAECOLOGY.—At Postgraduate Medical School of London, Ducane Road, W., October 4, 3 p.m., "*Tuberculosis in Pregnancy*," by Dr. R. C. Cohen.

Wednesday

GLASGOW UNIVERSITY: DEPARTMENT OF OPHTHALMOLOGY.—October 5, 8 p.m., "*Biochemical Aspects of Methanol Poisoning*," by Dr. G. Leaf.

Thursday

FACULTY OF HOMOEOPATHY.—At Royal London Homoeopathic Hospital, Great Ormond Street, London, W.C., October 6, 5 p.m., "*The Place of Homoeopathy in Modern Medicine*," presidential address by Dr. Margery G. Blackie; "*Present State of Homoeopathy in America*," by Dr. Viola M. Frymann.

LONDON COUNTY MEDICAL SOCIETY.—At St. Andrew's Hospital, Bow, E., October 6, 3 p.m., clinical meeting.

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL, Hyde Park Corner, London, S.W.—October 6, 4.30 p.m., lecture-demonstration: "*Neurology*," by Dr. A. Feiling.

Friday

KETTLE MEMORIAL TRUST.—At Royal College of Surgeons of England, Lincoln's Inn Fields, London, W.C., October 7, 5 p.m., "*The Significance of Functional Differentiation in Mammary Tumours*," Fifth Kettle Memorial Lecture by Dr. Beatrice Pullinger.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Benstead.—On September 16, 1949, at the Duke of York Home, Bradford, to Nancy Benstead, M.B., B.S., wife of J. G. Benstead, M.A., M.B., B.Chir., a daughter—Ursula Kathryn.

Holman.—On September 15, 1949, at Leeds, to Dorothy (née McNeill), wife of Dr. R. A. Holman, a son.

Lake.—On September 19, 1949, at "Fernwood," Newcastle-upon-Tyne, to Barbara (née Ivey), wife of Leonard H. Lake, M.B., B.S., D.O.M.S., 24, Eslington Terrace, Newcastle-upon-Tyne, a brother for Janet and John.

Leech.—On September 12, 1949, at Adrienne House, Axminster, Devon, to the wife of Dr. K. W. Leech, a son.

Waugh.—On September 16, 1949, in London, to Janet (née McDowall), wife of William Waugh, F.R.C.S., a daughter.

MARRIAGE

Backhouse—Izard.—On September 3, 1949, at the Christian Fellowship Centre, Honor Oak, London, S.E., Henry Lewis Backhouse, B.M.(Oxon), to Ruth Minifreda Izard.

DEATHS

Blair.—On September 20, 1949, at 5, St. John's Wood Road, London, N.W., George MacLellan Blair M.B., Ch.B., aged 74.

Field.—On September 21, 1949, Arthur Holmes Field, L.R.C.P.&S.Ed., L.R.F.P.S., of Bridlington, Yorks, aged 82.

Fox.—On September 20, 1949, Joseph Tylor Fox, M.D., D.P.M., aged 64.

Fraser.—On September 22, 1949, at 29, Crownhill Park, Torquay, Frank Fraser, M.D., of Moorgate, North Bovey, and formerly of Leigh, near Tonbridge, aged 92.

Glanville.—On September 15, 1949, at Margate, Ruby Ellen Glanville, M.B., B.S., of "Everest," Longdon Wood, Keston, Kent.

Hewitt.—On September 21, 1949, at Muchlarnick, Pelynt, Looe, Edmund Philip Hewitt, L.R.C.P.&S.Ed., Lieutenant-Colonel R.A.M.C., Ret.

Sutcliffe.—On September 18, 1949, at Smitterfield, near Stratford-on-Avon, Percy Temple Sutcliffe, M.B., B.Ch.

Thomson.—On September 20, 1949, William George Simpson Thomson, M.B., Ch.B., D.P.H., D.P.M., of Cheadle Royal, Cheadle, Cheshire, aged 58.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Immunization after an Attack of Diphtheria

Q.—*Are there any dangers to be expected, especially in patients who have not been Schick-tested, when immunizing children who have suffered from attacks of diphtheria some years ago?*

A.—A point implied in this question is that one attack of diphtheria may not protect against further infection, and this is true. Second and third attacks of diphtheria have been known to occur, and a fair proportion of children convalescent from the disease are Schick-positive. It may therefore be justifiable to immunize such children artificially in order to ensure a reasonable degree of resistance against further attack. If the children are over 8–10 years of age it is advisable to Schick-test before giving an injection of diphtheria prophylactic, since pseudo-reactors are likely to develop local or systemic reactions after an injection. These pseudo-reactors should not be given any prophylactic, but should be Schick-tested again three months later, when it may be found that they are now Schick-negative. Children in whom straight Schick-positive reactions occur should be given two doses each of 0.5 ml. A.P.T. or P.T.A.P. with a four-week interval, and Schick-negative reactors may be given a small boosting dose of 0.2 ml. If preliminary Schick-testing is not to be done, all children should be given an initial dose of 0.2 ml. T.A.F., followed, in those who do not react, by two further doses of 1 ml. at monthly intervals.

Nursing between Blankets

Q.—*I understand that the General Nursing Council still advocates that patients suffering from rheumatic fever or nephritis should be nursed between blankets. Is this practice desirable, and what is the scientific evidence for and against this measure?*

A.—The General Nursing Council is acting in this matter with the full approval of medical authority. The scientific principle involved is allied to the known fact that patients suffering from these diseases tend to sweat excessively. If such patients are nursed between sheets the latter will absorb the perspiration and, as the result of evaporation, heat will be abstracted from the surface of the patient's body, so chilling the skin and causing the peripheral vessels to contract and cut off the peripheral blood supply. It is also very unpleasant for the patient to be in contact with damp, cold sheets. When a blanket is used the sweat can evaporate through its meshes, but the heat of the body is retained owing to the fact that wool is practically a non-conductor.

Jelly-fish and Weever-fish

Q.—(*a*) *What is the treatment for jelly-fish stings? Any relevant reference to the literature would be welcome.* (*b*) *How should bites from the weever-fish be treated, and are there any references to this particular fish in the literature?*

A.—(*a*) When jelly-fish sting they inject the products of the normal "hair glands" which form the protective and aggressive mechanism in most Coelenterates. A number of chemical fractions which are toxic have been isolated from these animals, ranging from those producing narcosis in pigeons to those causing intestinal symptoms in dogs on injection. However, in British waters the important factor appears to be the "actinotoxine" of French workers, which produces local erythema with much pain and oedema, and even death with acute pulmonary oedema in small animals.

(*b*) Two kinds of weever-fish are found in British waters. The lesser weever, *Trachinus vipera*, lives inshore and is most to be feared. Its bite is harmless, but it has systems of poison glands and spines opening on to the surface. That on the dorsal fins is the important one, as the fish may hide in the sand and be trodden on. This may be followed by great pain and oedema and even gross inflammation of the affected limb, presumably due to the incidental introduction of bacteria or to some effect on the smaller blood vessels.

In both cases, then, the mechanism of response would appear to be anaphylactic, and human victims certainly experience constricting feelings in the chest. Adrenaline and local analgesics would appear to be indicated, and morphine if required, as for scorpion stings. Some marine animals feed on these poisonous creatures and are immune to their effects, while artificial immunity has been produced in experimental animals. In the case of scorpion stings, the children of some races are artificially immunized by repeated doses of venom, and even the application of extracts of the venom locally, with good effect. *Animaux Venimeux et Venins*, by M. Phisalix (Paris, 1922), is an excellent monograph which summarizes the extensive literature up to that date.

Precautions in Handling Radium

Q.—*Recently an industrial firm decided to test the welds in steel tubes by x-ray photography. The source of the rays is a 200-mg. capsule of radium. Exactly what precautions should be taken by the workmen handling this amount of radium?*

A.—(1) The radium tube should be stored in a lead box with a wall thickness of 10 cm., and locked in a safe in a remote place. (2) One person should be trained in the handling of radium and be made the radium custodian. He should read the recommendations of the British *X*-ray and Radium Protection Committee (October, 1948). (3) All the manipulations should be carried out as rapidly as possible, long-handled forceps or remote-control gear should be used, and the radium should be carried from place to place in long-handled boxes lined on all sides with at least 1 cm. of lead. (4) Those handling radium should carry measuring instruments which will record the dose received. (5) Unskilled work entailing exposure should be carried out by temporary workmen. (6) The radium container should be tested periodically for leakage.

Wax in the Ears

Q.—*What steps should be taken to prevent the accumulation of wax in the ears where there is no discernible meatal narrowing or any obvious reason why wax should accumulate? Would instillations of olive oil at, say, fortnightly intervals help?*

A.—It must be admitted that in very many patients wax accumulates because it is secreted in excessive amount or is of abnormal consistency. Such accumulation is aggravated by ill-advised attempts to clean the ears by poking the corner of a towel deeply in after washing. The use of oil as suggested should soften the wax and so favour its extrusion by physiological means. Apart from this there remains only regular syringing.

Male Climacteric

Q.—*Is there a male climacteric, and, if so, at what age does it commonly occur? What are the usual symptoms, and how long may they persist? Also, what would the treatment be?*

A.—The occurrence of a male climacteric is not accepted by all authorities. It was recognized by the ancient Arabian school of medicine and is accepted by a number of sexologists. It coincides with the period of involution of the genital tract, and, like the corresponding climacteric in the female, this is often associated with endocrine and psychological disturbances. However, there is no agreement about the age of onset. Max Thorek places it in the early fifties, Marcuse between 45 and 54, and Havelock Ellis as early as 38. The writer agrees with Zondek that, if the idea is to be accepted at all, the advent of the climacteric must be placed in the middle fifties or early sixties. It is then that men sometimes show an unaccountable change in temperament, a tendency to put on or lose weight, and a liability to such changes as enlargement of the prostate, the development of hydrocele, epididymal cysts, etc. The symptoms may persist, as in the female, for several years, and treatment depends on the symptoms; in many cases benefit is obtained by giving testosterone.

T.A.B., Cholera, and Smallpox Vaccination

Q.—*What is the youngest age at which T.A.B., cholera, and smallpox vaccines can be inoculated in a country like Pakistan or during an epidemic? What dosage should be employed? If it is considered that children under 1 year of age should not be inoculated, would you please give the reason?*

A.—Enteric fever and cholera are very rare infections in infancy, and young children who become infected usually have mild attacks. The inoculation of infants under 1 year of age with T.A.B. or cholera vaccines is therefore not recommended. For children of 1–5 years, one-quarter to one-third of the adult dose is given, and for older children half the adult dose. Smallpox can be a severe infection in infancy, and in a country where this disease is still prevalent the bulk of infection falls on children under 5 years of age. The newborn infant usually derives some passive immunity from the mother through the placenta, and the best time to vaccinate is between 2 and 6 months of age (optimum 3–4 months).

Sensitization to Actinic Light

Q.—*For the third summer in succession the skin of a woman aged 42 has reacted rapidly and severely on exposure to sunlight. The affected areas do not become tanned but remain pink, and subcutaneous nodules develop. The patient was in the Engadine in 1939 and was often exposed to strong sunlight, but there was then no reaction. Is there any reason for this late development of sensitivity? I would be grateful for advice on preventive measures and treatment.*

A.—The development of sensitization to actinic light may arise at any age and for no obvious reason; sometimes there is a familial tendency. At times, however, it is an accompaniment of metabolic changes associated with a focus of infection or gastro-intestinal dysfunction, or with endocrine imbalance as at the menopause. A careful overhaul and the correction of any fault would be wise. The taking of drugs, such as sulphonamides, may determine the onset. In idiopathic cases ephedrine or antihistamines by mouth, or injections of a gold salt in small dosage, may help. Protective applications are, however, generally necessary, and there are many effective ones, including *para*-aminobenzoic acid, yellow paraffin, titanium dioxide, tannic acid, quinine hydrochloride, and ichthyol powder. *Para*-aminobenzoic acid 15% in a cold cream or emulsifying base is suitable, or equal parts of "siccolam," yellow soft paraffin, and Halden's emulsifying base.

Infection of Seminal Vesicles

Q.—*What is the best method of treating a gonorrhoeal infection of 20 years' standing in a man aged 60? The focus is believed to be in the seminal vesicles. Massage, sulphonamides, penicillin, vaccines, etc., have been ineffective. Would vasotomy and injection of seminal vesicles be likely to be successful?*

A.—It is probable that the infection is no longer gonococcal, but that the condition is now due to other organisms; it might be well to have any urethral discharge and prostato-vesicular secretion expressed by massage examined bacteriologically with special reference to *Trichomonas vaginalis* and pleuropneumonia-like organisms. It would be unwise to try vasotomy in a patient aged 60 unless his condition is serious, and it is by no means certain that any benefit would accrue. Unless a specific organism is incriminated it would be better to try short-wave diathermy applied to the prostate and vesicles every few days. Aureomycin is well worth a trial if available. It is possible, of course, that the focus is in the urethra; this can be confirmed or excluded by urethroscopic examination.

Effect of Alcohol and Tobacco on Fertility

Q.—*Would you please advise me of the investigations carried out on the effect of smoking and of alcohol on fertility?*

A.—Repeated intoxication with alcohol has been shown to have a deleterious effect on spermatogenesis in rats (C. Lane Roberts and others, *Sterility and Impaired Fertility*, Hamish Hamilton Medical Books, London, 1948, 2nd ed.), but the writer has not seen any account of experimental work dealing with nicotine. In view of the known damage caused, mainly to the testes, by certain bacterial toxins and chemical agents, it is not unreasonable to assume that chronic alcoholism and excessive smoking might lower fertility, and many writers mention it as a possibility without producing evidence to support it. If these conditions ever have such an effect, it is likely to be difficult to prove it, because in practice they can rarely be separated from associated factors which might also lower fertility. For instance, excessive smoking and drinking tend to occur in individuals who are overworked or exposed to severe mental stress or who are leading an unnatural and unhealthy life in other respects. Again, even if fertility is lowered the effect might not be directly due to the action of alcohol and nicotine on the gonads—it might be accounted for by poor appetite and malnutrition, which are prevalent among heavy smokers and alcoholics. It may be added that, although certain individuals may be susceptible, everyday observation makes it clear that fertility often continues unimpaired despite such excesses.

NOTES AND COMMENTS

Antiseptics for Minor Dressings.—Dr. RUPERT PALMER (Lydd, Kent) writes: In an answer to a question on "Antiseptics for Minor Dressings" appearing in your "Any Questions?" column (September 17, p. 661) the statement is made that "mercury perchloride is not bland; it is exceedingly toxic and should never be applied to the body except, possibly, to the intact skin." This is complete and utter nonsense. The late Mr. Percy Legge, a senior honorary surgeon to King's College Hospital, under whom I was trained, used perchloride in varying strengths as a routine dressing for all his cases. I never saw one "go septic" or give any trouble whatsoever. I myself have used for the past twelve years a solution of 10% sodii sulphas in 1 in 2,000 perchloride as a routine wet dressing for all kinds of wounds large and small, skin abrasions, discharging boils, etc., with unvarying success. I have never seen any untoward sign at any time.

Corrections

Dr. GEOFFREY BOURNE (London, W.1) writes: Owing to a typing omission in my letter (September 24, p. 704) to you on distinction awards the point of my quotation from Pasteur has been missed. What Pasteur said was, "Tout le monde politique est contre moi." The occasion for this remark was his attempt to fight against the false dogma of spontaneous generation, and in this fight he was almost isolated in his opposition to the Académie Française and all it stood for in the way of subservience to tradition.

Mr. L. FATTI (Johannesburg) writes: May I draw attention to a small point arising in the article on "Direct Inspection of Coarctation of the Aorta with a Thoracoscope," by Mr. J. R. Belcher and Dr. F. E. de W. Caley (*Journal*, August 6, p. 137)? A personal communication is attributed to me dated 1949, stating that I had used this procedure before performing Blalock's operation. I think an error in the date has been made, since I left England in February, 1948, for South Africa. I performed the manœuvre first in 1947, and referred to it frequently before leaving England. Since then I have used it with increasing frequency for refining the diagnosis in various types of abnormality of the heart and great vessels, including coarctation of the aorta. The procedure is here becoming part of the diagnostic armamentarium of these diseases. Publication of the method has been delayed until a variety of cases has been accumulated to demonstrate its different aspects and uses.

Messrs. Butterworth and Co., Ltd., the publishers of *Modern Trends in Diagnostic Radiology*, which was reviewed in the *Journal* of September 24 (p. 688), write: Unfortunately the last paragraph in the excellent review is liable to give readers the impression that they will be unable to obtain a copy until the "second edition" is available. This is not the case. We are not doing a second edition yet, and the reviewer must be referring to the second printing.

In Dr. B. G. Gretton-Watson's communication (September 17, p. 651) the letters D.P.H. appeared instead of C.P.H.

All communications with regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1. TELEPHONE: EUSTON 2111. TELEGRAMS: *Aitiology, Westcent, London.* ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone. Authors desiring REPRINTS should communicate with the Publishing Manager, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs.
ADVERTISEMENTS should be addressed to the Advertisement Manager, B.M.A. House, Tavistock Square, London, W.C.1 (hours 9 a.m. to 5 p.m.). TELEPHONE: EUSTON 2111. TELEGRAMS: *Britmedads, Westcent, London.*
MEMBERS' SUBSCRIPTIONS should be sent to the SECRETARY of the Association. TELEPHONE: EUSTON 2111. TELEGRAMS: *Medisecra, Westcent, London.*
B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.